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# THE SUBMARINE PERIL

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ADMIRAL SIR ALEXANDER DUFF, G.C.B., G.B.E., K.C.V.O.,
FIRST HEAD OF THE ANTI-SUBMARINE DIVISION.
*From a Painting by John A. M. Kay.*

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# THE SUBMARINE PERIL

*The Admiralty Policy in 1917*

By

ADMIRAL OF THE FLEET, THE
RIGHT HON. THE EARL JELLICOE
G.C.B., O.M., G.C.V.O., ETC.

*With Eighteen Illustrations*

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# INTRODUCTION

IN several books which have been written since the conclusion of the Great War some of the methods have been mentioned by which the German submarine attack upon British, Allied and neutral shipping was defeated. In my own book, "The Crisis of the Naval War," published in 1920, I endeavoured to throw light upon the subject. At that time, however, it was not desirable to give full details of our methods, and all the information which we now possess on the subject was not then available. In addition, many misstatements on the subject have been published, and it is desirable that the real facts should be brought to light, both from the point of view of historical accuracy, and in order that our people should realize the gravity of the peril which confronted the Empire, our difficulties in meeting that peril, the reasons which led to the difficulties and the manner in which they were overcome. Unless those reasons are appreciated, and the necessary steps taken to ensure that we are not again placed in the same difficulty, the Empire may, should a similar situation again arise, find itself in the same dire peril.

To put it briefly the problem before the Empire in 1917 was as follows:—



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In February of that year Germany inaugurated the system of unrestricted submarine warfare, in which merchant ships of all nations approaching our shores, or indeed merchant ships in any part of the world in which German submarines could work, were liable to be sunk by torpedo without warning of any sort.

At the commencement of this form of warfare, Germany possessed some 140 submarines, and was commissioning new submarines at the rate of about six per month. The *average* rate of commissioning per month during 1917 was between seven and eight. During the year 1916 a total of only 22 German submarines had been sunk. They were then working largely on the surface and conditions for coping with them were therefore far easier than later on.

There were only three ways of dealing with the submarine menace. The first, naturally, was to prevent the vessels from putting to sea; the second was to sink them after they were at sea; and the third was to protect the merchant ships from their attack. The system of protection employed up to April, 1917, was mainly one of patrol, i.e. the routes which merchant ships were directed to use when approaching British shores were patrolled, principally by armed trawlers, armed yachts, motor-launches, and a few, a very few, fast vessels such as sloops. This system, which had given some degree of protection when the attacks upon shipping were mainly by gun-fire from submarines on the surface, was inefficient against the system of attack by torpedo alone from submarines submerged. The only alternative to

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the patrol system of defence was that of placing the whole trade under convoy, and, whilst there were grave objections to the adoption of convoy as a system, its adoption was utterly impossible unless an adequate force of fast vessels was available to screen the ships in the convoy against attack by submarines, in the same way that squadrons of men-of-war were screened. Readers of this volume will realize (1) the general objections to a convoy system; (2) its advantages; (3) the impossibility of its adoption until the United States had entered the war; and (4) the exceedingly complicated and complex organizations which its adoption involved, and without which it could not succeed.

Only careful study of the conditions existing early in 1917 can enable a true judgment to be formed of the position with which the Admiralty was then confronted, and it is largely because I am anxious that such a position should not again arise that this book has been written.

There are other reasons. One is a desire that the work of those who organized the means by which the danger was met and defeated should be adequately recognized in history. It is difficult to select names for mention, and for that reason the names of only a few of the principal officers who carried out this valuable work are given. It will of course be realized that they could not have succeeded unless they had been most loyally served and helped by their staff and assistants.

On the Admiralty side, the late Admiral Sir Alexander Duff, the head, first of the Anti-Submarine Division,

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and later Assistant Chief of the Naval Staff, was the officer who was largely responsible for the organization both of the offensive against German submarines, and the start of the convoy system. The defeat of the submarine menace was mainly due to the work carried out by Admiral Duff and the very able officers assisting him. Captain W. W. Fisher[1] took over the charge of the Anti-Submarine Division when Admiral Duff became Assistant Chief of the Naval Staff, and his work was of the greatest possible value. Paymaster Captain Eldon Manisty,[2] the officer who organized the Admiralty Convoy Section under considerable difficulties and who became Organizing Manager of Convoys, was very largely responsible for the striking success achieved by the convoy system. The exceeding care and accuracy necessary for success will be realized by a perusal of the latter half of this book. Commander Reginald Henderson,[3] Admiral Duff's naval assistant, worked in closest co-operation with Paymaster Captain Eldon Manisty. He assisted in working out the details of the system, was in constant conference with shipowners and members of the shipping world, and was a valuable asset in the working of the convoy system.

The convoy system could not have been started had there not been a Ministry of Shipping formed. At its head was Sir Joseph Maclay, now Lord Maclay,

[1] Now Admiral Sir William Fisher, K.C.B.

[2] Now Paymaster Rear-Admiral Sir Eldon Manisty, K.C.B.

[3] Now Vice-Admiral Reginald Henderson, C.B.

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and the Admiralty—indeed the whole Empire—owes a deep debt of gratitude to him and to the many eminent gentlemen associated with him in the work of the Ministry of Shipping.

Mr. (now Sir) Norman Leslie was head of the Convoy Section in the Ministry of Shipping. He worked in constant touch with the Admiralty Convoy Section, bringing to their daily meetings a unique expert knowledge of shipping and sea-borne trade which was invaluable. He was ever ready to meet naval requirements, however difficult.

I have mentioned the head organization before referring to the officers and men at sea who worked under this organization; but it was of course upon those at sea that the carrying out of the work really fell, and it was the devotion, gallantry, most able performance of duty and close attention to orders that characterized their splendid work which finally defeated the submarines. It is sad indeed to realize that the recent serious depression in the British Mercantile Marine has resulted in many thousands of the officers and men who served their country so splendidly in that service during the war being now unable to obtain employment afloat.

To turn to the future. If, as seems to be generally conceded, we are to expect indiscriminate bombing of towns, ships, etc., by air-craft should another war unhappily take place, can we be assured that submarine attacks upon merchant ships as carried out in the late war, will not also be practised by a nation fighting with

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its back to the wall? Can we be sure that treaty agreements can be relied upon under such conditions? Certainly the chances of treaty agreements being carried out are far greater if we have the power to enforce their observance. If there is any danger of such attacks in the future it is essential that the British Empire should be in a position to place mercantile traffic under convoy again.

Let us consider how our navy stands should we, in the future, have to re-institute a convoy system.

In regard to vessels for ocean escort, we supplied in 1918, 50 such vessels and the United States supplied a large number in addition. Some of our vessels were armed merchant ships. We now possess 52 cruisers altogether, of which ten are over the age limit of sixteen years. A considerable number of these cruisers are of course needed for work with the Battle Fleet. The number left available for convoy work is entirely inadequate.

In the early months of the Great War, two German light cruisers which were at large for only ten weeks, captured or sank 40 British and 7 neutral merchant ships although we had 53 British and 18 Allied men-of-war, in addition to 22 armed merchant ships operating on the trade routes.

Later in the war two armed raiders (disguised merchant ships) sank or captured 55 British, 10 Allied and 6 neutral merchant ships.

It should not be forgotten that we were far more favourably placed geographically to prevent the exit of

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raiders from German ports than we should be in the case of almost any other nation.

In November, 1917, the number of destroyers, sloops and "P" boats in use for the escort of our Atlantic trade through the submarine zone and English Channel totalled 170 (including 37 U.S.A. destroyers). In addition we had 32 similar vessels employed in the escort work of the Scandinavian convoy. For the Mediterranean convoys we required at least 30 such vessels, giving *a grand total of* 232. In addition there were the destroyers with the Grand Fleet, Dover and Harwich forces as well as those based upon various ports for defence purposes, for escorting troopships and hospital ships, etc.; a total for these services *of approximately* 217 *more vessels. Complete total* 449. At the present time we possess 152 destroyers and flotilla leaders built and building (of which 108 are over age). (*N.B.*—The life of a destroyer has been laid down as twelve years.) We have in addition 31 sloops. Grand total 183 for all services (108 over age).

One must not lose sight of the assistance which air-craft can, and did, give in protecting convoys against submarine attack in 1917 and 1918; but air-craft cannot possibly alone give the necessary protection even under favourable conditions of weather and near our shores. On the other hand, air-craft operating from ships on ocean trade routes may be an additional menace to merchant ships.

It is hardly necessary to point out the difficult position in which the Admiralty would be placed should it

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become essential in the near future to introduce a convoy system for the protection of our trade. Our difficulties in 1917 were very great. Those that would face a future Board would be indeed formidable unless it is realized that our naval forces are inadequate for the work that may be required of them, and steps are taken to make up our deficiencies. The fast vessels needed for escort against submarine attack cannot be improvised; cruisers take two years to construct and even sloops cannot be built, I think, in less than some eight months. Is it not time that provision is made to ensure the Empire against possible future disaster?

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# THE SUBMARINE PERIL

## CHAPTER I

### FACING THE MENACE

WHILE Commander-in-Chief of the Grand Fleet I had watched with anxiety the heavy losses of British merchant shipping caused by submarine and mine attack, and had in 1915 written both to the Admiralty and to the President of the Board of Trade urging that all possible steps should be taken to increase the output of new ships, in readiness to meet any serious increase in our losses; but the situation did not become really grave until the latter part of the year 1916, when the losses of British merchant ships from submarine attack began to rise very seriously and it became evident that some further steps to check the high rate of loss were essential. British losses were as follows:—

| | |
|---|---|
| September . . . . | 104,500 tons |
| October . . . . | 176,200 „ |
| November . . . . | 168,800 „ |
| December . . . . | 182,200 „ |

and world losses were rising proportionately. The matter was perhaps rather outside the province of the Commander-in-Chief of the Grand Fleet but I felt so



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strongly on the subject that I took it upon myself, on October 29, 1916, to write the following letter to the Admiralty from H.M.S. *Iron Duke*.

29th October, 1916.

1. The very serious and ever-increasing menace of the enemy's submarine attack on trade is by far the most pressing question at the present time.

2. There appears to be a serious danger that our losses in merchant ships, combined with the losses in neutral merchant ships, may by the early summer of 1917 have such a serious effect upon the import of food and other necessaries into the allied countries as to force us into accepting peace terms, which the military position on the Continent would not justify and which would fall far short of our desires.

3. The methods which have been used in the past for attacking submarines are not now meeting with the success which has hitherto attended them. The reasons for our present want of success, or for the difficulties in the way of success, are, firstly, the increased size and radius of action of enemy submarines, which enables them to work in waters so far afield as to make it increasingly difficult to trap them; secondly, the fact that they are attacking more frequently with the torpedo, and that this prevents the use of methods which were applicable to submarines which came to the surface; thirdly, the very powerful gun armament now carried by submarines, which makes them more than a match for our smaller patrol craft, who are therefore unable to work far afield and are forced to some sort of concentration, thus reducing their sphere of action; fourthly, the fact that the enemy having become aware of the methods hitherto in

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use, are therefore more or less able to avoid destruction by these means.

4. It is therefore essential for the successful conclusion of the war that new methods of attack should be devised and be put into execution at the earliest possible moment.

5. New methods may involve new weapons which must be provided with great rapidity, and possibly the abolition of old weapons may follow. For instance, the patrol trawler is rapidly becoming ineffective, owing to her low speed and poor armament. If these vessels are retained re-armament is essential.

6. The destroyer, although very effective in confined waters, and when present in large numbers, is ineffective for offence in open waters, as is any other vessel, by reason of the fact that the submarine has a submerged radius of action of well over one hundred miles, and can therefore, even if located, escape with great facility.

7. The destroyer is, of course, very efficient defensively as a screen to individual ships, or to a large number of ships; but, except in more or less confined water, is not an efficient offensive weapon, because she must, with her present means of offence, actually get into contact with a submarine, or very nearly into contact, which is a difficult matter if the submarine has plenty of sea room.

8. Our present methods of offence against submarines are to a considerable extent due to suggestions put forward by some of the younger officers, and the most promising method of evolving new methods appears to lie in the formation of a small committee of such officers who have shown in the past special inventive aptitude or originality. They should work under some senior officer, who will not only have the energy to carry through with great rapidity any

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promising suggestions which may be put forward, but will also have the power to so influence those in authority as to overcome all difficulties that may be encountered.

9. There are certain younger officers who are specially marked out for this sort of work. Amongst them I would include Commander Cyril P. Ryan, who has taken one particular line, namely, the evolution of the hydrophone, in which lies one possible solution of the question; Lieutenant Charles D. Burney, who has taken another line, and to whose energy and ingenuity is largely due the introduction of the present defensive measures against mines; and there are no doubt other officers, amongst whom I would include Commodore Ellison, whose work has not brought them into touch with me, but who are known to have shown themselves equally valuable for the purpose desired. What is required is to bring together a number of young officers who have proved themselves to be fitted for the special work required, and to work them under one head who also possesses the qualifications necessary for the post.

10. Lieutenant Burney has, during a recent visit to the fleet, made certain suggestions which may be practicable, and which at any rate should be considered. Amongst other proposals he suggests the use of howitzers designed to throw a series of bombs to cover the probable track of a submarine whose periscope has been sighted; these bombs to be of the nature of "depth-charges" and to be so fired that they fall at such distances apart as seriously to injure a submarine should she be "straddled" by the line of charges. Experience with howitzers and trench mortars seems to indicate that such an idea is a feasible proposition, if the difficulty of firing from a rolling platform can be overcome. But the proposal is one which should be tried in view of the extreme importance

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of the question. It is obvious that unless experiments with such a weapon were pressed forward with great energy, supply could not be made in time for any useful results to be obtained.

11. I am not, however, putting forward concrete proposals. My object in writing this memorandum is to press for the formation of a committee, whose one and only aim should be the production in the shortest possible time, and not later than the spring of 1917, of methods for overcoming the most serious menace with which the Empire has ever been faced.

If this committee included officers possessing the necessary qualifications, I should have great hopes that it would be the means of producing quickly some methods by which we should be able with some measure of success to cope with this ever-growing menace. Unless, however, such a committee has almost a free hand in the direction of experiment, is provided with all the necessary staff in the way of draughtsmen and technical experts, and is, moreover, free of the ordinary procedure for obtaining materials and manufacturing weapons, and has at its head an officer such as I have indicated, the effort will be too late.

12. It is a matter of great regret to me that there have been no recent successes against enemy submarines in the vicinity of the northern bases, but the conditions are such as to render success almost impossible.

In the first place, submarines in this locality have so much sea room that it is impracticable to corner them by means of destroyer sweeps when they are sighted, and there is the added difficulty of bad weather for a great part of the year.

Secondly, owing to the constant expectation of the fleet being required for sea at short notice, and the serious risks

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involved by sailing without the destroyer force as a submarine screen, it is not possible to send destroyers far from the base in any numbers or to allow them to get short of fuel.

As stated earlier, it is only in more or less confined waters that surface craft can act with any prospect of success against submarines that keep submerged. It is in the hope that we may discover methods of dealing with submarines under such conditions that I urge the action indicated above.

13. There are, of course, other measures which may tend to prolong the period during which our losses do not seriously embarrass the conduct of the war. Under this heading I include a thoroughly organized system of diverting ships with great rapidity from dangerous to safe routes, and the completion of all merchant ships now building in this and the Allied countries. The first of these two measures is, of course, a matter of policy. I forwarded a suggested procedure for consideration last year. The second measure may involve retaining men for the work who would otherwise be at the front or who would be engaged on munitions work, but the completion of merchant ships is of even greater importance than the supply of men and munitions.

Finally, it may quite conceivably be wise policy to divert destroyers from the Grand Fleet and from all other available sources, such as the Humber, Harwich, etc., for a thoroughly organized attack on submarines when it is known that they are operating in considerable numbers in comparatively narrow waters such as the Channel. This would involve demobilizing, say, one battle squadron for the time, but even this would be a step worth taking if any success could be achieved thereby. The Fourth Battle Squadron, for instance, might be moved to Rosyth and the flotilla attached to it utilized. It would

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be best to move the battle squadron to Rosyth first, so that the flotilla might have a better chance of rejoining (if time permitted and the fleet left for possible action with the High Sea Fleet), than if the Fourth Battle Squadron were retained at a northern base.

(Sgd.) J. R. JELLICOE.

As the result of this letter I was requested to go to London, where I met the War Cabinet and the matter was discussed. I was asked, amongst other things, if I thought that a convoy system would be a wise measure to adopt, but said that I did not think so. Such knowledge as was then at my disposal led me to think that the objections to a general convoy system *at that time* would be insurmountable. I knew that we were very short of cruisers and destroyers for escort work, and was doubtful about merchant ships in convoy being kept in sufficiently accurate station to ensure safety by a comparatively small number of escorting destroyers. Above all, I felt that this was hardly a matter on which I could, as Commander-in-Chief of the Grand Fleet, express an opinion of real value. The information necessary to come to a decision on a matter of this nature was only available at the Admiralty. As a matter of fact I had at an earlier date suggested to the Admiralty the desirability of instituting ocean convoys as a protection against raiders, but was informed in reply that this was quite impossible owing to shortage of vessels for the ocean escort. As I have stated, however, I had not any definite proposals to put forward, my main object in writing the letter being to obtain quickly the formation of a powerful

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Naval committee whose sole duty it would be to consider, and deal with, the submarine menace.

On the next day, the 3rd of November, I attended a conference on the subject at the Admiralty, the Sea Lords, Admiral of the Fleet Sir Arthur Wilson, the Chief of the Staff, and other Admiralty officers being present. I reiterated my view that there should be a Flag Officer of authority at the Admiralty presiding over a committee or department for the exclusive purpose of developing anti-submarine measures, to follow through suggestions with all speed and press their execution. I mentioned that I intended to take steps on my return to the Fleet to encourage thought and suggestions for countering the submarine menace. This action I took.

The report of the conference was considered by the Board of Admiralty after my return to the Fleet and it was decided that it would be desirable that a specially selected Flag Officer should be appointed to deal with the anti-submarine question.

During my visit to London, Mr. Balfour, the First Lord, had asked me if I would be prepared myself to leave the Grand Fleet and come to the Admiralty to deal with this matter. I felt so strongly on the subject that I at first told him that I thought I might consent to do this, particularly as I was then of the opinion that there was but a very slight chance of the German High Sea Fleet ever coming out again so as to give the Grand Fleet an opportunity of engaging it. (I held this view by reason of the retiring tactics invariably adopted by the

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High Sea Fleet whenever it was known that the Grand Fleet was at sea.) On thinking the matter over during the day that I was in London, I came to the conclusion, however, that I should be in a difficult position at the Admiralty under such conditions; and, just before returning to the Grand Fleet, I told Mr. Balfour in a further interview that I did not feel I could take on the work under the Admiralty Board.

Before any action on the conference was taken I was asked by Mr. Balfour, late in November, to leave the Grand Fleet and come to the Admiralty as First Sea Lord. I accepted the post, although it was with the greatest possible reluctance that I gave up my command to take on what I realized would be most difficult work, particularly on account of our shortage of destroyers, the vessels most needed for action against submarines.

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## CHAPTER II

### MEASURES TAKEN EARLY IN 1917 FOR PROTECTION OF TRADE, AND ACTION AGAINST SUBMARINES

ON my arrival at the Admiralty, and with the approval of the new First Lord, Sir Edward Carson, who had succeeded Mr. Balfour, the Anti-Submarine Division of the Naval Staff was formed, Rear-Admiral Duff being brought down from the Grand Fleet to preside over it. The division comprised several other officers taken from the Grand Fleet. The fine work of the division under that distinguished officer is recorded in my book, "The Crisis of the Naval War." I enumerate below some of its activities carried out in co-operation with other departments at the Admiralty, particularly those under the Director of Naval Ordnance and Director of Torpedoes and Mines.

1. A great advance in the matter of the provision and use of air-craft for anti-submarine work took place with close co-operation between the Royal Naval Air Service and the Anti-Submarine Division.

2. Improved types of seaplane, aeroplane and airship carrying heavier bombs for anti-submarine work were introduced and by July, 1917, air-craft were playing an important part in this work and in trade protection.



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Figures given in Chapter IV indicate the immense advance which took place in this direction.

3. Hydrophones were installed in craft engaged in hunting submarines, and shore hydrophone stations were largely developed.

4. "Otter gear" for the protection of merchant ships against mines was introduced and the supply hastened to the utmost possible extent. Ninety-five British ships had been fitted with Otter gear by July 1, 1917, and 900 by December 1, 1917. In addition, Otter gear was supplied to many merchant ships of Allied countries. There were, by the end of the war, at least 50 cases of the Otter ensuring the safety of vessels by cutting the moorings of mines in dangerous proximity to them.

5. A very great increase was made in the number of "Q" ships engaged in anti-submarine work. In July, 1917, we had 78 such vessels operating. However, by the autumn of 1917 it was evident that the "Q" ships had ceased to become an effective device against submarines, the submarine commanders having, as the result of the successes of these vessels, become so suspicious of ships which adopted their method of the crew abandoning ship on the vessel being attacked, that they would not close them sufficiently to allow of gun attack. It was therefore decided to cease building ships of this type.

6. The use of depth-charges for attacking submerged submarines was immensely developed, as will be seen by the figures given on pages 13 and 14.

7. Depth-charge throwers were introduced.

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8. High-speed coastal motor-boats for anti-submarine work were built in large numbers.

9. Smoke apparatus for supply to merchant ships for use as a screen against submarines attacking by gun-fire was largely developed. By the end of August, 1917, the number of outfits issued to merchant ships had reached a total of 2,174. At the end of October the total was 3,595. On December 25, 1917, it had reached 4,078.

10. As the result of trials carried out against a target representing the hull of a German submarine, a far more useful type of shell for use against submarines was introduced.

11. Another great blow to the German submarine warfare was the adoption of an efficient mine, Mark H.

The British Navy had been very considerably handicapped throughout the war both by a shortage of mines and also by the inefficiency of the type of mine in use. As regards shortage, I recollect well our difficulties over Naval Estimates in pre-war days when I was serving as Director of Naval Ordnance, in the years 1906 and 1907. Owing to cuts in the Estimates we were quite unable to obtain an adequate supply of mines even for our very moderate estimated requirements in those days. I am not conversant with the history of our mines subsequent to 1907, but it was found early in the war that the type then possessed by us failed against both surface vessels and submarines. It was not until the early part of 1917 that a satisfactory type of mine was at last produced. As soon as this

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new mine had been tested, orders for 100,000 were placed and arrangements made by the Director of Torpedoes and Mines for very speedy manufacture. Delivery commenced about July, 1917, and mine-laying on a large scale was carried out in the Heligoland Bight, in the Straits of Dover and elsewhere during the remainder of the year. Whereas in 1915 and 1916, a total of only 6,177 mines had been laid in the Heligoland Bight, we laid 10,389 in the Bight and the Straits of Dover in the last quarter alone of 1917, the total delivery of mines during this quarter being 12,450. The result later, in the Bight and in the Straits of Dover, was very satisfactory. This large increase of mining activity necessitated the fitting out of a very considerable number of ships as mine-layers under the supervision of Admiral R. N. Ommaney, C.B.

All these steps naturally took time to develop and I knew that it would be some months before we should reap any real benefit from them. This knowledge naturally led to anxiety on my part.

As an instance of the time taken to develop new measures I will take that of the supply of depth-charges to destroyers. In January, 1917, the supply was only sufficient to give an allowance of four to each destroyer. It was obvious that this was totally inadequate for attacking submerged submarines, and orders for a very large number were placed. The weekly output in July, 1917, was only 140, although immense efforts had been made to increase it. By the end of 1917 the weekly output had reached 800 and the number was rapidly increasing. While early in 1917 we could only use from 100 to 300

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depth-charges per month owing to shortage, in the last six months of the war an average of 2,000 per month was used. By the beginning of 1918 destroyers were carrying 30 to 40 depth-charges instead of four, the original number. There is no doubt that the increased use of the depth-charge was a great factor in the defeat of the submarine menace. German submarine officers themselves have stated the nerve-shattering effect that this method of attack had on them, and such of our own submarine officers who had similar experience owing to their vessels being mistaken for an enemy submarine fully confirm the German view. The convoy system alone could not possibly have defeated the submarines had it not been accompanied by an ever-increasing expenditure of depth-charges by the escort vessels. *The ability to use depth-charges in larger numbers enabled the submarine escort to use offensive measures against the attacking submarines.* This is indicated by the figures given on page 40 showing the number of submarines—eleven—destroyed by escort vessels in 1918 as compared with one in 1917.

Another matter taken up with energy was the provision of more guns for the defensive armament of merchant ships and the fitting of a greatly increased number of merchant ships to take the guns. These defensive armaments for merchant ships had been introduced on a small scale before the war, as a protection against armed merchant cruisers. A system was also introduced by which guns were changed from ship to ship as they were required, there still being not

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enough to go round. The following figures are of interest in this connexion. In September, 1916, we had 1,749 ships fitted to take a defensive gun armament. By February 22, 1917, this number had been raised to 2,899 ships; by May 15, 1917, to 3,253, and by the end of December, 1917, to 3,656. The number of guns available for these ships in December, 1916, was 1,420. During the year 1917 a further total of 2,986 guns was provided, many of these having been obtained from France and Japan. They proved to be a valuable antidote to gun attack by submarines so long as they worked on the surface, as is shown by the following figures:—

Between January 1, 1916, and January 25, 1917, 310 defensively armed British ships were attacked. *Of this number* 236 *escaped,* 62 were sunk by torpedo without warning, and 12 only were sunk by gun-fire from the submarine. On the other hand, in the case of unarmed British ships during the same period, 302 were attacked, *of which only* 67 *escaped;* 30 were sunk by torpedo without warning, and 205 were sunk by gun-fire or bombs.

Apart from the gun defence possessed by merchant ships against attack by submarine, the protection afforded at the end of 1916 to vessels in the Mediterranean and when approaching British shores, was as follows:—

(1) A special system of routeing merchant ships by Naval officers at the various ports at home and abroad was in operation.

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(2) Local patrol flotillas composed of armed trawlers, yachts and a few sloops guarded certain approach areas near the United Kingdom and in the Mediterranean.

(3) Organized attacks were carried out on submarines as soon as any were located.

(4) The use of "Q" ships with offensive armaments was in operation on a comparatively small scale.

(5) Sailings were suspended when danger threatened.

Beyond the vessels forming the local patrol flotillas the only force available at the end of 1916 to safeguard traffic was a flotilla of 14 destroyers stationed at Devonport. These vessels were fully employed on the work of escorting troopships and vessels carrying specially valuable cargoes through the submarine danger zone. As regards the local patrols, the system was for the trawlers and yachts to patrol the coastal traffic lanes and for the few "Q" ships and sloops available to be on the approach routes.

The introduction of unrestricted submarine warfare by the Germans in February, 1917, led naturally to a great deal of anxiety on the part of the Admiralty. The first counter step was to introduce a system of five alternative lines in each of the four approach areas to United Kingdom water, along which lines vessels should shape their course; these lines of approach were changed at certain stated intervals, the escort vessels being sent to work on the selected line, the object being to change the line of approach before enemy

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A German Submarine and a Victim of its Torpedoes.

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submarines had discovered the one in actual use. An advantage of this system was that the patrol craft on the approach line actually in use were obviously far more numerous than they could be if scattered over an area, and both the protection afforded, and the chances of a torpedoed vessel's crew being picked up, were therefore greater. The obvious objection, however, to this system, which was common to all systems of patrolled routes, was that, after a time, the submarine commanders became aware of the route in use by the mere presence of the patrol craft on it. The periodical change of approach line did of course to some extent overcome this objection. Another arrangement put into force when unrestricted submarine warfare was declared, was to develop a patrolled lane system close to the coasts of the United Kingdom, the ships being instructed to hug the coast as closely as possible. They were thus brought into close touch with the surface and air-craft patrols, and made it more difficult for submarines to work submerged because of the shallow water. To assist this arrangement an additional flotilla of 10 destroyers taken from the Grand Fleet was established at Devonport. This system kept down losses by gun attack in the Channel and off the Cornish and Irish coasts, but failed to meet the situation as regards torpedo attack.

Arrangements by which ships with specially valuable cargoes, such as munitions, were met and escorted into port had been in operation since 1915 and was continued in the early part of 1917. The extent to which this



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engaged the services of some of the few destroyers we had available for escort work, will be realized from the fact that during the first three months of 1917 the average number of vessels of this nature met and escorted into port was 4·34 per day.

In March, 1917, it was deemed necessary to alter this method of protecting vessels carrying valuable government cargoes. They were given special routes and passed through an area which was patrolled as thickly as possible. Even under this arrangement, with unrestricted submarine warfare in operation, the losses were still heavy. By June, however, a convoy system had been started and was gradually extended as more escort vessels became available.

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## CHAPTER III

### BRITISH NAVAL POLICY

IN the previous chapter I have summarized the methods—which had to be largely of a defensive nature—adopted by the Admiralty in the earlier months of 1917, to deal with the danger with which the Empire and our Allies were faced, due to the intense submarine warfare upon merchant ships, British, Allied and Neutral.

Before I pass on to the consideration of offensive measures designed to defeat the menace by attacking it at its source, and the introduction of the convoy system, it is as well to state briefly the general lines of British Naval Policy which had been approved by successive War Cabinets, including that of 1917, and which remained unaltered from the commencement of the war to its close.

In August, 1917, a committee of the War Cabinet reviewed our war policy, and so far as the future Naval Policy was concerned could only suggest that, apart from the development of the convoy system, which was already in operation, the problem of devising offensive plans against enemy submarines and their bases should be continuously studied.

The object of British Naval Policy, as of all war



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policy, was to bring such pressure on the enemy as to compel him to come to terms.

Whilst it was only possible to obtain definite results by offensive action, we had to pay serious attention to the defensive side of sea strategy, since the British Empire was entirely dependent on the sea for its existence. The work being carried out by the British Navy during the war included the protection of the sea communications of our armies—both in France and overseas—the stoppage of the enemy's trade, the protection of our own and our Allied trade, and finally, protection against invasion. These objects necessitated our having command of the sea. This we had obtained early in the war so far as the *surface* of the sea was concerned, and the only method by which the Germans could interfere with this command of the surface of the sea was by defeating the Grand Fleet.

The German Navy had, however, throughout the war, refused to face a sea action, unless the leaders thought they were in contact with an inferior British Naval force. They had adopted the principle of the "Fleet in being." We had as in the old wars held this Fleet "in being" immobile, and had kept the command of the sea surface.

The advent of the submarine in Naval warfare introduced an entirely new feature, independent of large fleets, and the Germans in 1917 distinctly possessed a very considerable command of the sea, by means of her submerged vessels.

To defeat this menace novel methods were necessary.

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There were, as is usual, two possible methods, offence and defence.

Offence was very difficult owing to the invisibility of the enemy. His bases were invulnerable to attack by sea. Defence was by convoy, escort, mine-sweeping, etc. We had completely stopped Germany's overseas trade, but overland trade was still open to her, and apart from submarine attack the only damage being inflicted on our trade was by one or two disguised raiders.

In our effort to defeat German submarines we were employing thousands of small vessels for convoy, patrol and escort work, and these vessels were dependent for their protection and existence upon the Grand Fleet. In a somewhat similar degree, the German submarines were to a certain extent dependent upon the High Sea Fleet for the success of their operations.

The position occupied by the British Grand Fleet was influenced by the necessity for our maintaining full control over the North Sea and its exits, in order to prevent any enemy vessels designed to attack our trade reaching the Atlantic, and in order to protect the force, viz. the 10th Cruiser Squadron and its supports, whose duty it was to prevent trade reaching Germany. There had been a few instances of disguised raiding vessels escaping into the Atlantic Ocean, in spite of the control exercised over the northern part of the North Sea by the Grand Fleet and cruiser squadrons attached to it, and there was also always the possibility of the enemy sending out cruisers or battle-cruisers for an attack upon our Atlantic convoys, besides, of course, the

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danger of a surface attack upon the Scandinavian convoys.

The objection to the Grand Fleet being based on Scapa Flow was the difficulty with which it was faced should a German raid on the East Coast take place. It was largely for that reason that Rosyth had been prepared to take the Grand Fleet. This necessitated a great deal of work, and it was a very long period before the requisite anti-submarine defence could be brought into existence. There was a distinct advantage in basing the Grand Fleet at Rosyth, owing to the greater facility from that base, as compared to Scapa Flow, of intercepting any German raiding attack upon the East Coast, and of forcing action with the High Sea Fleet should it put to sea, and move to any considerable distance from its bases. There was, however, still the disadvantage that control over the northern exit of the North Sea could not be exercised so easily from Rosyth, as from Scapa Flow. It was also true, as pointed out to me by Sir David Beatty, in a letter dated February 8, 1915, that the Battle Fleet would, if at Rosyth, be far more vulnerable to submarine attack, on putting to sea, than at Scapa. The result was that the Grand Fleet was often divided, some portion remaining at Scapa Flow.

As regards the southern part of the North Sea, we had to depend on the Harwich and Dover Forces as a deterrent to an attack in that area from the High Sea Fleet. These forces were supported from 1917 onwards by a battle squadron in the Medway, and the narrow

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waters of the Dover area and their mines, etc., themselves constituted a certain defence against operations by the High Sea Fleet. The main enemy force with which our southern vessels had to deal were the enemy's destroyers and submarines, based on Bruges, Zeebrugge and Ostend.

So far as invasion was concerned, the Admiralty did not look upon any such attempt in 1917 as in the least degree probable.

I had on one occasion in June drawn up for the information of the War Cabinet a table showing the general distribution of our naval forces, which compared the relative strength of the Grand Fleet and the High Sea Fleet, should an action between them take place at the enemy's selected moment. This showed that we could depend upon 30 Dreadnought battleships, against 19 German Dreadnoughts and 7 pre-Dreadnoughts; that we had a superiority in number of battle-cruisers of 8 British to 5 German, but that this superiority was largely discounted by the very inferior armour and under-water protection possessed by our vessels as compared with the German. Of light cruisers, we possessed 27 to 20 German; but the Germans had in addition a large number of Zeppelin airships which were very useful for scouting purposes. As regards destroyers with the Fleets, the Germans were largely superior in numbers, apart altogether from the fact that our Grand Fleet destroyers were constantly being used for such purposes as escorting vessels of the 10th Cruiser Squadron, the Scandinavian Convoy and

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cruiser squadrons carrying out sweeps in the North Sea. Many of these destroyers would not have been available had the Grand Fleet been ordered to sea to meet the High Sea Fleet.

The subject of Naval War Policy had, as might be expected, occupied the minds of senior officers in the Grand Fleet since the opening of the war, and I had frequently discussed strategical questions with them and had at various times received and considered suggestions. In November, 1916, just before I left the Fleet to go to the Admiralty, Admiral Sir Doveton Sturdee, commanding the 4th Battle Squadron—who had been Chief of the War Staff at the Admiralty at the commencement of the War—expressed his views on naval strategy in an interesting paper which is here reproduced.

He informed me that he had sent a copy to Sir Henry Jackson, the then First Sea Lord. I was of course well aware of the feeling prevalent in some quarters that more offensive action was expected from the Fleet, but was also convinced that the bombardment of German forts and action by the Grand Fleet in the Heligoland Bight, where German mines, submarines and destroyers could play a very effective part, would only be playing the German game, with the possible result of our losing the command of the sea and the consequent loss of the war.

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## Appendix to Chapter III

### A few remarks on the main naval strategy of the war

By Admiral Sir Doveton Sturdee

1. The articles written by the late First Lord[1] have raised doubts in the minds of many thoughtful people as to the wisdom of the general Naval strategy of the war. Curiously, they are the exact reverse of what he advocated when in office and as expressed in public speeches.

No doubt there is a feeling underrunning the thoughts of the nation, which is only seldom expressed in the public Press that, due to its great preponderance, more is expected from our Fleet. Some offensive action was so often written about and discussed during the period from 1900 and onwards before the war, while the German Fleet was being built and formed, that it must still exist.

Many people then advocated, no doubt without knowledge, that we should prevent this Fleet being increased, by threats of war. In ignorance of their past naval and military history they fondly imagined that a superior Navy could accomplish this, without even having voted for or raised and maintained an Army of any size. This prevailing ignorance, which still exists, may at any time rise and

[1] Mr. Winston Churchill.



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cause a feeling that there is a lack of offensive energy on the part of the Admiralty and the Fleet in general, and thus may have a prejudicial effect on the generous regard at present expressed for what our Fleet has done.

2. As I happened to be Chief of the War Staff at the Admiralty for the first three months of the war, and since then have been serving as an Admiral in Command afloat, I venture to write down my thoughts for what they are worth, having now had war experience both ashore and afloat.

3. I may say that, broadly, I am in entire agreement with our present strategical policy. It has the advantage of the support of our past Naval history, recent maritime history of other Powers, and in addition the experience obtained in the present war.

4. With regard to any criticism which may be made on the non-bombardment of the German coast, the relative power of "ships versus forts" has been the main controversy dividing the opinion of technical experts.

Our past history shows that, except in a few isolated instances, our Naval forefathers declined to pit a Fleet against a properly fortified base, when that base belonged to an efficient and powerful military Power.

Many reasons could be given which are even truer to-day than formerly. Modern inventions appear to have acted disadvantageously to the Naval attack:—

(*a*) The main one was, and still remains, that a ship being the carriage of a battery of guns is sinkable, while the shore battery of guns is unsinkable.

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(*b*) A further disadvantage is that a ship makes a very good target, silhouetted against the horizon, for the shore guns to aim at, and its battery of guns is perforce concentrated, while guns on shore can be dispersed and rendered nearly invisible from the ship. The whole water area commanded by the guns of a shore battery can be carefully marked off, guns laid and fired by most accurate instruments to be reasonably certain of hitting a ship as it comes into or passes through their commanded area.

(*c*) The ship, however much the laying of the guns may be improved, can never possess the initial advantage of a shore battery. In fact, modern improvements have acted against ship seriously engaging shore batteries, and this without bringing in the influence of torpedoes and mines, which adversely affect the ship, and obviously cannot be used against shore batteries.

5. Colonel (now Major-General) C. E. Callwell in his work published in 1905 on "Military Operations and Maritime Preponderance," after treating the historical side very fully on page 165, sums it up very succinctly by saying:—

Had France, the weaker side at sea, during the war of the Revolution and Empire, been powerless on land, Bridport and St. Vincent and Collingwood would not have been obliged to lie off and on, in fair weather and foul, for months and months, watching the French armament in Brest, nor would Nelson have spent two most anxious years of his

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strenuous life maintaining a position of observation with a crazy Fleet ready to destroy or to pursue La Touche Treville should he put to sea from Toulon. The operations would have assumed a totally different aspect.

My reason for quoting this is that it seems so accurately to describe the present position.

The whole book is worthy of attention.

6. The attack on the Danish Fleet at Copenhagen by Nelson in 1801 is one of the great exceptions to the general principle of not using a Fleet to attack ships protected by serious fortifications, but history points out that in this case the situation was very critical at certain periods.

The successful bombardment of Algiers in 1816 by Lord Exmouth is another exception and a very striking one.

7. Against these must be taken the various proposals which may be found in the Admiralty Library and Record Office for attacking Brest and Toulon between 1793–1808. They appear to have been fully considered at the Admiralty and even referred to the Admiral in Command, who invariably rejected them unless a military force was added.

Coming to more modern times, the Naval bombardment of the forts of Sebastopol had to be discontinued, due to the damage the ships were receiving.

The results of the bombardment of Alexandria in 1882, were disappointing; the old stone forts crumbled away under the fire of the Fleet, but very few guns were put out of action by direct hits. (Many were rendered

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useless due to sand and stones covering the slides of the guns, and on firing them the pivoting bolts were torn out, slide and gun consequently being thrown up in the air.)

Two 7″–6½-ton M.L. guns mounted separately in recently constructed earthworks (Hospital Redoubt), received the fire from four battleships at 2,500–3,000 yards for over an hour; with the exception of one gun's crew who were swept away by a shrapnel burst, these two guns were efficient when the bombardment ceased about 5.0 p.m.

During the Spanish-American War, Sampson, an admiral who had shown considerable energy, refused General Shafter's request to force the entrance to Santiago, the defence being only two or three rather antiquated forts. Sampson anticipated the entrance being mined. Eventually the influence of the attacking army drew the Spanish squadron to sea and to their doom.

The Chino-Japanese and the Russo-Japanese wars show the same strategy, i.e. not unduly risking ships against forts, but using them to assist and support the Army in their efforts to take the fortress and thus, either force the Fleet to put to sea or to be destroyed in harbour. The orders given to Togo are very clear on this point.

The American Civil War showed that, provided mines are inefficient, ships may be able to run past forts which have not been carefully planned or placed, but not attack them directly.

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It may be generally summed up that, in the former days, with few exceptions, forts were found and considered undesirable to attack unless loss of ships could be allowed without compromising our sea supremacy.

8. It may not be generally appreciated that submarines have never been used in former wars; neither has a nation been encountered by any Power that has so deliberately, carefully and scientifically prepared for war for so many years in advance.

In August, 1914, we met this nation. It was a matter of common knowledge that:—

(i) Its coast was difficult to approach or to use for fixing accurately the position of the ship or Fleet, due to the low-lying land and shoals.

(ii) Forts and guns had been carefully placed along the coast at all important places.
Heligoland had been made into a first-class fortress, thus partly covering the entrance to the Elbe and Jade.

(iii) Torpedo bases had been formed at all suitable positions along the coast.
Great pride had been taken in developing their Torpedo Flotilla.

(iv) An excellent mining system had been organized for years to protect in a few hours the entrance from attack.

(v) A well-developed mine-sweeping service was ready and constantly practised.

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(vi) An uncertain number of submarines, estimated at 38 or 40, were ready and believed to be very efficient.

(vii) Behind these defences a powerful fleet of all classes existed. This fleet had been for many years exercised in war manœuvres, and carefully trained and tested in gunnery and torpedo exercises. Each new unit as it was completed was added to the High Sea Fleet, which as a whole was known to be efficient and ready for war.

(viii) The rôle of the German Fleet was publicly stated in 1900, with frequent repetitions, for both home and foreign consumption, i.e. to be so strong that even the principal Naval Power would hesitate before opening hostilities.

9. Next—What were our engagements?

(*a*) First and foremost, to assist France in the defence of her Belgian Frontier, and Belgium, if possible, its neutrality having been broken by the Germans.

(*b*) Next, to protect the North Coast of France from Naval aggression and to protect the transport of troops from Tunis and Algeria from attack from the *Goeben* and *Breslau*. These engagements were fulfilled.

10. The Grand Fleet from its base at Scapa was a sufficient threat to prevent the High Sea Fleet moving.

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The Channel Fleet protected the flank of the transports crossing the Channel, without interference.

The Naval Force available in Home Waters may be briefly summarized as follows:—

(1) A sufficient preponderance of Dreadnought battleships.
(2) An excess of pre-Dreadnought battleships.
(3) A bare equality of battle-cruisers.
(4) A deficiency of modern cruisers for the work required.

*Note.*—Obsolete cruisers had to be used for work for which they were not suitable.

Abroad, to protect trade, there was a grave deficiency of cruisers. The Germans had more modern and faster ships on several stations. The cruiser situation was extremely unsatisfactory and in some ways dangerous.

In the Mediterranean there were three battle-cruisers, four cruisers and four light cruisers in lieu of pre-Dreadnought battleships which had been withdrawn in 1912 or 1913. This, with the whole French Fleet, should have been more than was required.

11. To consider the main Naval Strategy of the war, the first question that was continually arising during the first months of the war was—"should any of the German fortresses be attacked?"—Heligoland and Borkum attracted the most attention, and their bombardment had some advocates, and these, important ones.

After one hundred years of Naval peace, there was a feeling that something should be done; this no doubt

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NORWEGIAN STEAMER *Cuna* SINKING AFTER BEING TORPEDOED BY A GERMAN SUBMARINE.

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still exists in the public mind, largely due to the inefficient manner in which our national history is written and taught and the comparatively few who study it after they leave school or the University. The attacks on Heligoland and Borkum, in reply to constant pressure, were each weighed and considered. The advocates did not appear to have considered the historical analogies. Fortunately for the safety of the future civilization of the world, they did not succeed in carrying their point; so the Grand Fleet is still powerful enough to contain the High Sea Fleet and meet it when it comes out of its base.

12. Incidentally it may be mentioned that the only ships which the British Navy could afford to risk were the pre-Dreadnought battleships. The guns of these ships, however, have not the range of the German guns mounted in their shore batteries; further, due to the lack of cruisers in distant seas, several of these battleships were required to strengthen the foreign stations until the German cruisers outside the North Sea had been disposed of.

13. If any justification is necessary the experience of the war seems to provide it, e.g.:—

(1) The Naval attack on the Dardanelles.
(2) The failure of the German attack in the Bay of Riga in the autumn of 1915, of which full particulars are at the Admiralty, and the more recent, but minor, one by German destroyers.

The Germans in the Baltic seem to be in the same difficulty that we are in regard to the North Sea, and



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from the little I know beyond these instances they have not been able to act with any effect against the weaker Russian Fleet. The guns and torpedo defences of Pola similarly protect the weaker Austrian Fleet from any aggression from the Allied squadrons in those parts.

14. The inactivity of the German Fleet was a surprise to most Naval officers. The Heligoland Bight Raid was an intentional method of trying to draw them out; this did not act, and later on the whole Fleet swept round the Bight without encountering any foe.

Supplies, stores, drafts and fresh brigades have been continually poured into France, and the stream is continuing and will do so until the end of the war.

15. To sum up. It is only a repetition of Naval History from the time of Nelson. Nelson tried every means to induce the French Fleet to come out, but, when they chose and not before, they left the safety of their guns and met their fate months afterwards at Trafalgar, and off Cape Ortegal a month later.

(Signed) F. C. D. STURDEE.

24th November, 1916.

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## CHAPTER IV

### OFFENSIVE ACTION AGAINST SUBMARINES

IN addition to the defensive policy of providing for the safety of our merchant ships during the unrestricted submarine warfare in 1917, it was of course essential that every possible sort of offensive action should be taken against the submarines and their backing the High Sea Fleet. Our object was to destroy submarines at a greater rate than the output of the German shipyards. This was the surest way of counteracting their activities. It was mainly for the purpose of attack on the submarines that I had formed the Anti-Submarine Division of the Naval Staff. The personnel of this Division included a large number of officers who had been serving with me in the Grand Fleet or who had recent sea-going experience during the war.

Indeed it may be said that the Divison was manned almost exclusively by officers who had served at sea for the greater part of the war, and that in accordance with the view expressed to the Admiralty in my letter from the *Iron Duke* of October 29, 1916—younger officers who had shown special inventive abilities in connexion with anti-submarine warfare were included in it. Lord Carson has told me since the war that the Prime



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Minister, Mr. Lloyd George, was constantly urging him, while First Lord of the Admiralty, to bring to the Admiralty, for service on the Naval Staff, some of the younger officers serving at sea. Mr. Lloyd George evidently was quite unaware of the fact that special steps had been taken in this particular direction from the moment of my leaving the Grand Fleet to assume office at the Admiralty. Lord Carson has told me that he was so continually being pressed on this point by Mr. Lloyd George, in spite of his own assurances that this policy was in fact being carried out, that he eventually handed to him a list of over 70 officers then serving at the Admiralty who had all come recently from service at sea during the war.

One can gather from some books written since the war, that there were apparently certain junior officers who went to, and were received by, Mr. Lloyd George, and who formulated to him ideas for dealing with the submarine menace. Personally I never heard of their proposals. It is true that Mr. Lloyd George did make one or two suggestions to me for dealing with the menace, but these were of such a nature that they could not have emanated from the brain of any Naval officer.[1] They were not, however, so strange as one sent to me in 1917 by a gentleman, who said that the obvious

[1] Mr. Lloyd George in 1917 appeared to be obsessed with the idea that the opinions of junior officers were of more value than those of their seniors. In this connexion I recollect, when present at a meeting of the War Cabinet in 1917, hearing the Chief of the General Staff inform the Cabinet of the views of Sir Douglas Haig on some military operation. Mr. Lloyd George interrupted and said: "I do not agree with the Commander-in-Chief; I have a letter here from a subaltern in the trenches which gives an entirely different opinion."

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solution of the danger was to fill the North Sea with Eno's Fruit Salt, which would, he said, force the submarines to the surface. If the junior officers received by Mr. Lloyd George had any ideas to put forward, it is strange that they did not ask to see me or some other officer in authority. But it must be recognized that junior officers from the sea, and indeed senior officers, unless in high position *at the Admiralty*, could not by any possibility have possessed that fullness of information on which alone opinions of value could be founded.

At the head of the Anti-Submarine Division was Rear-Admiral A. L. Duff, who came from serving as Rear-Admiral in the 4th Battle Squadron. He had been supervising at Scapa Flow the trials of the paravane and devices of a similar nature designed to protect ships from mine attack, and was specially suited for anti-submarine work, being ever ready to receive and try new ideas and being gifted with imagination and great organizing ability. His exceeding value, first as head of the Anti-Submarine Division, and later as Assistant Chief of the Naval Staff, with a seat on the Board of Admiralty, was most fully appreciated not only by myself, but by all those connected with anti-submarine work and the convoy system. Full proof of the confidence with which his work was regarded was shown at the end of 1917 when he resigned from the Board on the occasion of my leaving the Admiralty, to the dismay of all those who had worked with him. Fortunately he eventually consented to remain to supervise the work.

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In December, 1916, Captain F. C. Dreyer,[1] who was my Flag Captain in the *Iron Duke* up to the time of my leaving the Grand Fleet, was his principal assistant. No one knew better than myself the great ability, the very clever brain, and the immense capacity for work possessed by Captain Dreyer. He remained in the Division until asked to take over the appointment of Director of Naval Ordnance a few months later, in which office he succeeded in organizing the production of a new armour-piercing shell of far greater efficiency than that in use by us at Jutland.

He was succeeded in the Anti-Submarine Division by Captain W. W. Fisher,[2] who had been in command of the *St. Vincent,* one of the battleships of the Grand Fleet. Here again was an officer of proved ability, gifted with original ideas and great energy. He became Director of the Anti-Submarine Division when Admiral Duff became Assistant Chief of the Naval Staff. Captain Walwyn,[3] also from the Grand Fleet, and Captain Claude Seymour, who had been with the Operations Division of the Naval Staff, were Assistant Directors in the Division by April, 1917. There were also five commanders in the Division, mostly from the Grand Fleet, including Commander Lewes, a submarine officer, Commander Reginald Henderson, a gunnery officer who, later, carried out valuable work in connexion with the convoy system, and Commander Yeats Brown.

There were in addition two lieutenant-commanders and an engineer commander. By the end of 1917 the

[1] Now Admiral Sir Frederic Dreyer, K.C.B., C.B.E.
[2] Now Admiral Sir William Fisher, K.C.B.
[3] Now Vice-Admiral Humphrey Walwyn, C.B., D.S.O.

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Anti-Submarine Division had doubled its numbers, many of the additional officers having joined it from sea appointments. The Mine-Sweeping Division with Captain Lionel Preston at its head, which in April, 1917, consisted of Captain Preston alone as captain of mine-sweeping, comprised in December one captain, one commander, and four lieutenant-commanders or lieutenants in addition.

### The Search for an Offensive

In regard to offensive operations it is of course true that a convoy was, in a measure, able to take *offensive action when once the escorting forces had been provided with an adequate supply of depth-charges,* because if the submarines came into contact with our escorts they could then be attacked. It will be seen from Table II on p. 40 that whilst in 1917 only one submarine was sunk by convoy escorts, the number in 1918, when depth-charges became plentiful, was 11. It was, however, too much to hope that this system would by itself destroy enemy submarines at a greater rate than they were being built. Our information in 1917 was to the effect that the Germans were completing submarines at the rate of about eight per month and destruction at that rate was very difficult. Such information as we were able to obtain during 1917 regarding the number of German submarines built, building and actually available, gave us at approximately the following periods the figures given in Table I. Tables II and III give information regarding submarine losses.

(*N.B.*—It is not possible, even at this date, to be certain of the entire accuracy of the Tables.)

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## TABLE I

| Date 1917 | BUILDING | | | AVAILABLE |
|---|---|---|---|---|
| | *On the Slips* | *Launched* | *Total Building* | |
| September . | 100 | 107 | 192 | 175 |
| November . | 100 | 101 | 207 | 178 |
| December . | 80 | 112 | 192 | 179 |

## TABLE II.—SHOWING METHODS BY WHICH GERMAN SUBMARINES WERE DESTROYED IN 1917 AND 1918.

*(Obtained by an analysis of Messrs. Gibson and Prendergast's book.)*

| | 1917 | 1918 |
|---|---|---|
| By Q ships . . . . . | 5 | .. |
| By T.B.D.'s, and other fast craft not on convoy escort but on hunting patrol . . . | 14 | 11 |
| By slow vessels such as trawlers, drifters, yachts, etc., on patrol or hunting patrol (not on convoy work) . . . . . | 7 | 10 |
| By our submarines on hunting patrol . . | 7 | 7 |
| By our mines (*a*) In North Sea . . . | 5 | 4 |
| (*b*) Dover Area . . . | 3 | 8 |
| (*c*) Elsewhere . . . . | 2 | .. |
| By our aircraft on hunting patrol . . . | 6 | 1 |
| By mine nets . . . . . | 3 | 1 |
| By convoy escorts. . . . . | 1 | 11 |
| Rammed or sunk by merchant ships . . | 1 | 4 |
| By vessels on ocean convoy escort duty . . | .. | 1 |
| Missing (cause unknown) . . . . | 3 | 4 |
| Interned after damage . . . . . | 2 | 1 |
| Self-destruction due to accident . . . | 4 | .. |
| Mined in Northern Barrage . . . . | .. | 6 |
| | 63 | 69 |

*Note*:—This Table can only be taken as approximately accurate.

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TABLE III.—GERMAN SUBMARINE LOSSES DURING THE WAR

| | *U. Boats* | *U.B.s* | *U.C.s* | *Total* |
|---|---|---|---|---|
| 1914 . . | 5 | .. | .. | 5 |
| 1915 . . | 14 | 2 | 3 | 19 |
| 1916 . . | 7 | 8 | 7 | 22 |
| 1917 . . | 19 | 12 | 32 | 63 |
| 1918 . . | 17 | 42 | 10 | 69 |

The difficulty of obtaining a successful attack against submarines by the escort of a convoy or single ship, is shown in the case of the *Justicia*, a very large vessel of 32,000 tons. She was attacked to the North of Belfast on July 19, 1918, when very strongly escorted by 12 patrol vessels, including destroyers. She was hit by a torpedo from U.B.64 at 4 p.m. on the 19th of July. Thirty-five depth-charges were dropped by the escorting vessels in the supposed vicinity of the submarine in the endeavour to sink or disable her. At 6 p.m. two more torpedoes were fired at the *Justicia*, and 23 more depth-charges were dropped. At 8.30 p.m. a fourth torpedo was fired, followed by the further dropping of 11 depth-charges by the escorting vessels. After this attack, the submarine exuded oil, and presumably may have been leaking. At noon on the 20th of July, a fifth torpedo was fired, on this occasion from U.54, and the *Justicia* was sunk. Both the submarines escaped, in spite of the fact that 69 depth-charges had been dropped by the escort vessels in their attack upon them. It is, however, true that during the hunt for U.B.64 and U.54, three of our destroyers made contact with yet another submarine,

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U.B.124, and sank her with depth-charges. Before the *Iusticia* sank, 40 patrol craft had been collected in the endeavour to save her.

These facts are recorded in Messrs. Gibson and Prendergast's most interesting book on the German submarine war, where mention is also made of an attack by Hersing in U.21 on a convoy of 15 ships S.W. of Ireland. At least 6 destroyers were escorting the convoy. U.21 was chased and depth-charged for 5 hours but got away.

In addition to the attack on submarines by surface craft, air-craft and our own submarines, which were the only methods available in the early part of 1917, there remained, so far as Home waters were concerned, the possibility of preventing their exit from their bases to the Atlantic. This might be effected to some extent:—

(*a*) By extensive mining in the Heligoland Bight to prevent them leaving their bases without danger of striking a mine. This was only feasible in regard to the North Sea bases. The exit from Kiel via the Kattegat, could not be mined without infringing neutrality.

or (*b*) By laying a mine-field across the northern part of the North Sea from Scotland to Norway. For this an immense number of mines was needed—a supply far beyond our own manufacturing possibilities without the aid of the United States.

There was one main difference between these two methods. A channel or channels could of course be swept by the German mine-sweepers through a mine-

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field laid in the Heligoland Bight. Our mine-layers could not pass our mine-fields already laid, so gradually the mine-fields progressed farther and farther to the north and west in the Heligoland Bight. This brought the German mine-sweepers farther into the North Sea away from their protecting vessels, and gave ships of the Grand Fleet the possibility of attacking them, thus making these mine-sweeping operations more and more difficult. An attack of this nature actually took place in November, 1917.

So far as the northern barrage across the North Sea was concerned, it was obvious that the Germans could make no attempt to interfere with it by mine-sweeping, as the distance from their own ports was far too great. It also, except in Norwegian territorial waters, was a menace to submarines coming out via the Kattegat. It had, however, the disadvantage of requiring, as mentioned before, an immense number of mines, as well as a large force of surface vessels to compel the submarines to dive into the mine-field on their passage north.

(*c*) Another method considered was that of establishing a closer blockade off the German naval bases, in order to bring on offensive operations between the two navies, with a view to the final destruction of the German Fleet. An operation of this nature involved as a preliminary the capture of an island or islands in the Heligoland Bight as a base from which our small craft could carry out their offensive operations.

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(*d*) Yet another method was that of sealing up the enemy's North Sea naval bases by the old method of sinking block-ships across the channels of exit to the sea.

(*e*) There was the final method of destroying the enemy's naval bases. This was an operation involving large military assistance.

(*f*) One other suggestion made to me by some United States engineers who accompanied Colonel House on his mission to this country in 1917 may be mentioned. I met Colonel House and his mission at Plymouth, and travelled with them in the train to London, and the engineers of the mission in a talk with me said that they had brought proposals for building a breakwater across the North Sea to prevent the exit of German submarines into the Atlantic. I pointed out to them the length of breakwater required, the depth of water with which they would have to deal, the immense amount of material that would be required for such a breakwater, and the impossibility of finding sufficient ships to bring that material to its destination, in view of the heavy losses from submarines at that period. The proposals were of course not put forward.

It will be of interest to consider each of these matters in turn, as they appeared during the year 1917.

During the first six to eight months of the year the danger to be apprehended from the success of the un-

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restricted submarine war was most acute. New measures were being gradually introduced and perfected, but their provision took time, so that the only immediate step that could be taken—apart from the introduction and gradual extension of the convoy system—was the destruction of submarines by such methods as we then had at our disposal. Our operations were heavily handicapped by the fact that most of the fast surface craft which could operate with the greatest chances of success against submarines were required for convoy escort. But thanks to the efforts of the Anti-Submarine Division in bringing forward fresh devices, producing new weapons, and arranging for intensive manufacture, our success in sinking submarines increased quarter by quarter in spite of the great difficulty of dealing with an enemy who could only be seen on the rarest occasions.

The Table on p. 46, column 1, taken from Vol. V, "Naval Operations," gives the number of German submarines estimated to be operating at sea in Home waters, the Atlantic and the Arctic, during 1917 and the first six months of 1918. The losses of British ships by raider, submarine and mine attack during each month of 1917 and the first six months of 1918, are also given, as well as information regarding convoys. The second column gives the number of submarines operating *in all seas*, according to Messrs. Gibson and Prendergast's book, the authority in this case being Michelsen.

The rate of loss in shipping diminished very considerably after August, when convoy was really in

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| Month | Submarines Operating | | Tonnage of British Ships Sunk | Convoys Homeward | | Convoys Outward | |
|---|---|---|---|---|---|---|---|
| | Vol. 5, "Naval Operations" | Gibson and Prendergast* | | No. of Convoys | Total Ships | No. of Convoys | Total Ships |
| 1917 | | | | | | | |
| January . | 15 | | 153,000 | | | | |
| February . | 46 | 38 | 313,400 | | | | |
| March . | 57 | 36 | 353,400 | | | | |
| April . | 75 | 42 | 545,200 | | | | |
| May . . | 74 | 42 | 352,200 | 2 | 28 | | |
| June . . | 62 | 61 | 417,800 | 4 | 60 | | |
| July . . | 66 | 42 | 364,800 | 15 | 266 | | |
| August . | 53 | 45 | 329,800 | 29 | 447 | 18 | 219 |
| September . | 74 | 59 | 196,200 | 33 | 505 | 37 | 570 |
| October . | 60 | 55 | 276,100 | 37 | 550 | 35 | 490 |
| November . | 55 | 30 | 173,500 | 36 | 517 | 37 | 431 |
| December . | 65 | 60 | 253,000 | 37 | 452 | 37 | 555 |
| 1918 | | | | | | | |
| January . | 62 | 33 | 179,900 | 35 | 535 | 34 | 410 |
| February . | 67 | 50 | 226,800 | 35 | 560 | 29 | 409 |
| March . | 70 | 37 | 199,400 | 39 | 626 | 33 | 487 |
| April . | 63 | 44 | 215,500 | 43 | 710 | 35 | 440 |
| May . . | 65 | 55 | 192,400 | 42 | 613 | 41 | 584 |
| June . . | 57 | 36 | 162,900 | 41 | 717 | 40 | 578 |

* It will be seen that there is considerable discrepancy between the figures given in Vol. V, "Naval Operations," and those given by Michelsen and quoted by Gibson and Prendergast.

operation. This, of course, was due to the difficulty submarines had in locating the convoys, to the losses sustained by them due to our offensive measures, and partly also to the fewer British ships afloat.

### Attack by Surface Craft, Submarines and Air-craft.

The difficulty of carrying out successful attacks on German submarines by the methods which were at our

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disposal, or which we had instituted during 1917, was naturally not appreciated by people without intimate knowledge of this class of vessel. Some idea of this difficulty will be gleaned from the following facts.

In the latter part of 1917, the number of encounters of all natures that took place with submarines was as follows:—

During August there were 87, in October 65, in November 65, and in December 70. During the last three months—October to December—a total of 200 ***actual encounters***. At that time we formed the conclusion, from the evidence then at our disposal, that these 200 encounters had resulted in 16 submarines being sunk. Later information gives the figure as 23, still but a small percentage of the actual engagements.

According to the information gained by us at the time, the areas in which the submarines were working in the four months mentioned and the number at work were as shown below. It will be seen that the number at work, according to the information in the Table on p. 46, was considerably greater than was then estimated.

During August the number of large submarines thought to be out varied between 15 and 20. The number of smaller submarines was from 8 to 10. The greatest activity took place to the north and west of the British Isles, where the average number of submarines was thought to be about 10. Some two or three were working in the approaches to the English Channel, two in the northern part of the North Sea

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were carrying out persistent attacks on the Scandinavian convoys, and some three or four appeared to be working off the north of Ireland, close in to the North Channel. There were also one or two in the vicinity of the Azores. Three or four of the small submarines were working in the Bay of Biscay, probably in the endeavour to intercept United States transports bound for Brest, and in addition there were several more off the East Coast of Great Britain.

During September a total of some 29 large submarines and 15 smaller ones were thought to be operating. From 3 to 7 in the North Sea, from 3 to 7 in the English Channel, 3 to 6 in the approaches to the Channel, from 7 to 16 in the Atlantic, 4 to 7 in the Mediterranean, and one in the White Sea.

At the end of September, 1917, the Admiralty formed the conclusion from information intercepted, that several enemy submarines would be returning to their bases during the early part of October, and an operation to attack them was therefore planned, and carried out under the command of Captain Cayley, D.S.O., R.N.

The information led us to believe that the submarines would be passing south between the longitudes of 0.° 30'E. and 3° E, and that they would pass between two mine-fields which were on the eastern side of the Dogger Bank. Mine nets were laid just south of latitude 56 N. for a length of some ten miles, and four torpedo-boat destroyers and sixteen trawlers were detailed to patrol the line of nets, and to force submarines to submerge

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GERMAN SUBMARINE-SHELTERS AT BRUGES.

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into them. To the northward of the nets a considerable area was patrolled by a flotilla of destroyers in order to force the submarines to submerge, and yet further north four of our submarines were patrolling another area. To the southward of the line of nets, torpedo-boat destroyers from the Harwich Force were also on patrol.

The nets were laid on October 1. Explosions were heard by listeners on the hydrophones of the trawlers on October 2 and 3, and on the evening of the 9th of October two submarines which were sighted were attacked by depth-charges from the trawlers.

Persistent bad weather prevailed until October 10, when the operations ceased. This weather made the work of all the patrol craft very difficult. Nevertheless, thanks to the good organization and fine work of the mine-net drifters, etc., it was believed at the time that the operations resulted in the successful destruction of three submarines. Information obtained since the war reduces the number to two at the outside.

For some little time after this operation, the German submarines used the Kattegat for both their outward and homeward journeys, there being presumably a suspicion that the two submarines had been lost in our mine-fields in the Heligoland Bight or by some other successful operation in that vicinity.

During October a total as high as 30 large submarines was estimated as being out. From 3 to 6 were in the North Sea, 3 or 4 north-west of Ireland and Scotland, from 2 to 4 off the south-west of Ireland, one in the Irish



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Sea and Bristol Channel, 3 in the English Channel and its approaches, one or two in the Bay of Biscay and from 3 to 6 in the Atlantic. Some 10 to 12 smaller submarines were out.

During November the number of large submarines located varied from 10 to 16, with an average of about 4 in the North Sea, one or two off the north-west of Scotland and Ireland, one or two off the south-west of Ireland, one in the Irish Sea and Bristol Channel, 2 to 4 in the English Channel and approaches, one to two in the Bay of Biscay, 2 to 4 in the Atlantic. Some 10 smaller submarines were believed to be out.

During December, 15 to 20 large submarines were located, 3 or 4 in the North Sea, one off the north-west of Ireland and Scotland, one or two off the south-west of Ireland, 2 or 3 in the Irish Sea and the Bristol Channel, 3 or 4 in the English Channel and approaches, one to two in the Bay of Biscay, 2 to 4 in the Atlantic. Actually some 27 large submarines were out. It was thought that about 8 to 10 smaller boats were also out. Later information shows that the number was as high as 17.

Early in November, 1917, it was ascertained that practically all outward-bound submarines were adopting the English Channel route. Until a short time before this, it was quite the exception for this route to be taken, but it now appeared to be the rule, and it was expected that this route would be continued until the new "ladder" mine-field had been laid. The operation of laying this mine-field had just been started.

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As will be seen by the figures on page 40, our best successes against the German submarines in offensive operations during 1917 were in order of merit obtained by (1) Attacks made by our destroyers, sloops and other fast patrol craft; (2) by our mines; (3) by our trawlers and slower patrol craft; (4) by our submarines on hunting patrol; (5) by our air-craft; (6) by "Q" ships. A large number of the patrol craft successes resulted from submarines being sighted on the surface, and it is hardly necessary to give any account of operations of this nature. They were comparatively simple, and were the result of good organization with a happy combination of circumstances which led to the patrol craft being in a position to sight the submarine. One could not wisely depend upon such good fortune, and it was to deal with the more usual and more difficult cases that the hydrophone system, which had been greatly extended, was in operation. With this system our patrol craft could gain contact with a far greater number of submarines, and provided they could keep in touch with them, would have a good chance of ultimately sinking them by depth-charges or bombs. The difficulty, in the early days of hydrophone work, was to keep in touch.

A sample of one of many encounters of this nature took place on November 15, 1917, between M.L.s 334, 357 and 350 and Airship C. 9. It shows how difficult and uncertain the method was when carried out in the open sea. The summarized report on the operation gave the following information:—

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*Times.*

13.00 Oil patch sighted by M.L.s 334 and 357.

13.20 Submarine first heard on hydrophone by M.L.s 334 and 357.

14.40 M.L. 357 proceeded two miles to S.E.

14.45 to 15.15. M.L. 357 located submarine, apparently on the bottom and using auxiliary machinery. The position was buoyed and two D* and two G depth-charges, set for 40 feet, were dropped. M.L. 334 closed, and submarine was heard W. by S.; both boats proceeded about a mile in this direction and again heard submarine N.N.E. and proceeded back about a mile, when "unmistakable wake and surface disturbance of a submarine" was sighted.

15.45 M.L. 334 attacked and let go two D* and two G depth-charges set for 80 feet.

16.00 Hydrophones used, but nothing heard.

16.16 Airship C. 9 arrived.

16.30 Airship sighted oil track, dropped a flare and came to conclusion that oil was from something moving under water, and dropped bombs 200 feet ahead of oil track. M.L. 334 also dropped two G depth-charges by direction from airship's flares.

17.10 M.L. 350 arrived.

17.15 M.L. 350 sighted periscope 300 yards away, ran through the wake and dropped two depth-charges (depth setting not reported). M.L. 350

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states wake was going in a westerly direction, M.L.s 334 and 357 state wake was going in a southerly direction.

Hydrophone operations were carried out till November 19, also sweeping and diving operations; oil was found in considerable quantities, but submarine was not located. Oil, however, was reported as being there, and covering two miles, before any attack was made.

Four separate attacks were made.

(*a*) Attack with two D* and two G depth-charges by M.L. 357. Submarine located by sound only, apparently of auxiliary machinery. It is impossible to locate exact position with a directional, and, plotting attack in both vertical and horizontal planes, there is no reason to suppose submarine would be damaged. No evidence of damage.

(*b*) Attack by M.L. 334 with two D* and two G depth-charges on "unmistakable wake and surface disturbance of submarine." If neither periscope nor other part of submarine was seen, it is difficult to say what this was—probably wash from propeller which might well be 300 feet from a vital part of submarine. No evidence of damage.

(*c*) Attack by C. 9 with bombs and M.L. 334 with two G depth-charges on line of oil apparently from object moving under water. No evidence of damage.

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(*d*) Attack by M.L. 350 on periscope sighted 300 yards off with two D* depth-charges (setting not given). No evidence of damage.

Lieutenant-Commander Michell, Newlyn Hydrophone Flotilla, reported that he considered submarine was probably destroyed.

If this was the case then the submarine must have been destroyed by M.L. 350, as there is no evidence to show that she was damaged previously. If it was the periscope tube itself which was sighted by M.L. 350, then the bottom of the submarine was about 30 feet from the bed of the sea, under which conditions the depth-charge setting would be a most important factor.

A submarine in these circumstances, in 13 fathoms of water and so damaged as to be unable to struggle to the surface in her death throes, would be bound to leave evident signs of her destruction. On the other hand, if her hull had not been vitally damaged, it is possible to imagine circumstances in which she could not eventually come up. This is, however, a highly improbable contingency.

It is impossible to form an estimate of the chances of the success of the attack by M.L. 350 on a periscope sighted 300 yards away in failing light, as the details given were insufficient.

Up to the date in question there had been no authentic case of a submarine known to have been destroyed by depth-charges, where she had not shown on the surface, or else left obvious signs of destruction.

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Another encounter of interest took place on December 15, 1917, and was as follows:—

At 6 p.m. a division of fish hydrophone trawlers being disposed in cruising formation in lat. 50° 27 N., long. 0° 45 W., *George Borthwick* reported hearing a submarine faintly, bearing E.S.E. Course was altered, hunting formation taken up, and speed increased to maximum. Direction, taken at intervals of 20 minutes, varied between E. by S. and E.S.E., the noise getting louder. At. 8.45 p.m. *George Borthwick* reported that the submarine was starting and stopping her engines, endeavouring to synchronize with the division's stopped periods. This rendered obtaining direction a difficult matter, with the result that at 9 p.m. it was found that her bearing had suddenly changed to north. The consequent alteration of course put the ships in line ahead —a formation bad for getting cross bearings—and the rear ship was too far astern for her hearing to be effective. *Andrew King's* fish was working badly so that the onus of the hunt devolved on *George Borthwick*. The submarine worked round to S.W. by S., then S.S.W., and at 9.30 p.m. was steering east; *George Borthwick* thus crossed her track several times, and reported the noise much louder. At 10.30 p.m. the submarine was heard to rise to the surface and change over to Diesel engine —exhaust explosions being distinctly heard. H.M.S. "P.38" had just been directed to steam ahead, when *George Borthwick* reported that the submarine had dived again at 10.42 p.m. At 11.30 p.m. *George Borthwick* reported the submarine very close ahead steering east.

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The noise was so loud that the receivers could be taken off the ears, and the sound distinctly heard in the silent cabinet. The "P" boat was sent on ahead, but owing to the submarine doubling, first E. by S., then to E. by N., it was not till 12.50 a.m. that *George Borthwick* ordered her to release charges. She dropped four depth-charges in routine manner at the psychological moment—the submarine apparently being 400 to 500 yards ahead of the *George Borthwick,* and the charges exploded roughly 500 yards ahead of her. Immediately after the explosion all ships stopped and listened. The first explosion was a very heavy one—remarked on by everyone in all four ships—and was followed by a very strong smell of fuel and oil. As soon as possible *Andrew King* anchored on the spot and listened on her shark-fin hydrophone, whilst *George Borthwick* cruised around, listening on her fish instrument. After waiting 8 hours 25 minutes not a sound was heard by the listening trawlers. The chase altogether occupied 6 hours 55 minutes, and covered roughly 49 miles.

It will be seen that great patience and perseverance were necessary in carrying out operations of this nature. In the first case the chase extended through more than six hours, and in the second for nearly seven hours.

### Operations by Air-Craft on Patrol

The number of submarines sunk by air-craft during 1917 is given in the Table on page 40 as six. It is of interest to note the immense amount of work that was

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necessary to achieve what might be considered to be a very moderate amount of success considering the number of submarines sighted and attacked during the patrol of the air-craft.

| *Four weeks ending* | *Mileage flown over sea* | *Submarines sighted* | *Submarines attacked* |
|---|---|---|---|
| *Heavier than air craft* | | | |
| August 11, 1917 . | 70,000 | 10 | 8 |
| October 13, 1917 . | 87,000 | 20 | 15 |
| November 10, 1917 . | 78,000 | 18 | 12 |
| December 8, 1917 . | 90,000 | 17 | 11 |
| *Airships* | | | |
| August 11, 1917 . | 42,000 | 3 | 2 |
| October 13, 1917 . | 70,000 | 4 | 3 |
| November 10, 1917 . | 52,000 | 3 | 1 |
| December 8, 1917 . | 50,000 | 6 | 5 |

The value of air-craft in protecting the ships of the Mercantile Marine near our coasts was unquestionably great. For example, on the East coast of England the surface vessel patrol had been very considerably weakened in the effort to provide escort ships for the Scandinavian convoys, with the result that the coastal traffic depended to a great extent on air-craft patrol for safety. The Handley Page machines, based on Redcar, had been appropriated for the patrol of the Yorkshire coast. But in October, 1917, these machines were withdrawn for service in France, with the result that between October 17 and October 20, six ships were sunk by submarines in this particular area, a very

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| Nature of Vessel | Out. | | | | | | In. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Escort Duty | Patrol | Minesweeping | Guarding Fishing Fleet | Total | Under Periodical Refit | Refitting, Blowing Down, and Making Good Defects | Harbour Service | Special Orders | Total | |
| Yachts | 5 | 25 | .. | .. | 30 | 3 | 14 | 2 | .. | 19 | |
| Trawlers | 165 | 132 | 283 | 7 | 587 | 77 | 217 | 12 | 49 | 355 | |
| Drifters | 12 | 314 | 74 | 16 | 416 | 67 | 202 | 97 | 85 | 451 | |
| M. L.s | 5 | 111 | 28 | .. | 144 | 52 | 87 | 7 | 48 | 194 | |
| Whalers | 7 | 3 | .. | .. | 10 | 1 | 5 | .. | .. | 6 | |
| Motor Boats | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | |
| Paddlers | .. | .. | 10 | .. | 10 | 2 | 12 | .. | .. | 14 | |
| Armed boarding steamers | .. | 1 | .. | .. | 1 | .. | 1 | .. | .. | 1 | |
| Examination tugs | .. | 2 | .. | .. | 2 | 1 | 3 | .. | .. | 4 | |
| M. F. A.'s | .. | .. | .. | .. | .. | 2 | .. | .. | .. | 2 | |
| Miscellaneous small craft | .. | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | |
| TOTALS | 194 | 589 | 395 | 23 | 1,201 | 205 | 541 | 119 | 182 | 1,047 | |

GRAND TOTAL 2248

*Note.*—In addition two paddle mine-sweepers, seven trawlers, and one M.L. were in harbour, undergoing trials and fitting out.

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marked increase on the previous average losses in this neighbourhood.

### The Auxiliary Patrol

It will be of interest to give some particulars of the vessels of the auxiliary patrol which were engaged in protecting the Mercantile Marine by escort, patrol and mine-sweeping. The Table opposite shows the total of the various classes of vessels employed on a particular date at the end of November, 1917, and distinguishes between those which were out of harbour and those that were in at noon on the date in question.

The armament of the various vessels on the date in question was as follows:—

Of the patrol trawlers 301 were armed with 12-pounders, 696 with 6-pounders, 77 with 3-pounders and 6 were unarmed. Of the mine-sweeping trawlers, 3 were armed with 12-pounders, 104 with 6-pounders, 2 with 3-pounders. Of the drifters, 335 were armed with 6-pounders, 585 with 3-pounders, 27 unarmed. Of the motor drifters, 14 were armed with 2-pounders or 2½-pounders and 103 unarmed. Of the motor-launches 26 were armed with 13-pounders, 2 with 6-pounders, 295 with 3-pounders, 94 with 2-pounders and 29 unarmed.

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## CHAPTER V

### OTHER NATURES OF, OR SUGGESTIONS FOR, OFFENSIVE ACTION

1. *Mining the exits from the North Sea German ports.*

IT was not until the autumn of 1917 that mines of a satisfactory pattern became available. Shortly after my arrival at the Admiralty I had some trials carried out with a view of ascertaining how far the pattern of mine then in existence could be depended upon to explode if hit by a submarine. The trials showed that only about *one mine in three* could be depended upon to give a satisfactory result.

A new pattern mine on the German model, termed the "H" type, had been designed in 1916 and was experimented with in the spring of 1917. Some initial defects appeared, and as soon as they were remedied orders were placed for 100,000 of these mines, for laying in the Heligoland Bight and the Straits of Dover. Arrangements were made by Rear-Admiral the Hon. E. Fitzherbert, Director of Mines and Torpedoes, for the quickest possible manufacture, and delivery commenced in the summer, some 1,500 being ready for laying by September, when supplies were coming in rapidly.



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Arrangements had been made for a very large increase in the number of vessels fitted for mine-laying, which in January, 1917, comprised only four merchant ships and one flotilla leader. By the end of the year we had added to the mine-laying fleet 12 cruisers, 12 destroyers or flotilla leaders and 5 submarines, and an immense number of mines had been laid in the Heligoland Bight, and the Straits of Dover, the total in the last two quarters of the year being over twenty thousand.

2. *The North Sea Barrage of Mines.*

The first difficulty in connexion with this policy, which had been originally suggested by Admiral Bacon to Sir Henry Jackson, then First Sea Lord, in 1916, lay in the fact that the great depth of water in which the mines had to be laid necessitated the invention of a special type of mine. No such mine was in existence at the time that further proposals for the Barrage came from the United States, but eventually a mine was designed which was fairly satisfactory, although a large number exploded prematurely when being laid. The effort to produce a suitable design caused a good deal of delay.

The next problem was the production of the immense number of mines, some 120,000, needed for the Barrage, the length of which was 230 miles. The great manufacturing resources of the United States overcame this difficulty, but delays were again involved, and the Barrage was not completed until well on in 1918.

The operation of laying the mines was divided between ourselves and the United States Navy, and

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was eventually carried out successfully. One weakness inherent in this Northern Barrage was the fact that it had to stop short of Norwegian territorial waters, which still provided an exit for submarines.

3. *The Introduction of a Close Blockade off the German Bases.*

Proposals for an operation of this nature had been put forward in considerable detail to the War Cabinet. They did not emanate from the Admiralty, but were examined by the War Staff under my directions. This policy necessitated the backing of a force of capital ships capable of dealing with the High Sea Fleet should it support counter attacks on our blockading force of small craft. It also necessitated the capture and occupation of a forward base for our small craft, and, in order that the advanced force of capital ships should be to some extent immune from attack by mine or by torpedo from destroyers and submarines, protection against this form of attack was essential. To risk the capital ships of the Grand Fleet in positions where they would unquestionably receive such damage from mine or torpedo as to jeopardize the superiority of that force over the High Sea Fleet and our consequent command of the sea, would have been a suicidal policy. The idea underlying the scheme of close blockade was for the advanced force to consist of such of the older battle-ships of the Grand Fleet as could be spared (whilst still retaining a sufficient superiority over the High Sea Fleet), and for these vessels to be backed up by battle-ships obtained from our Allies, the French and the Americans.

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It was proposed to fit these battle-ships with "bulge" protection against mine and torpedo.

It was argued by the author of the proposal that if it were possible to establish a close blockade off the enemy's ports constant offensive operations by our small craft would lead to frequent action between these vessels and those of the enemy, with the result that the Germans would find it necessary to bring back many of the submarines acting against trade, in order to reinforce the flotillas. Should the Germans bring out their heavy ships to attack our small craft, such a step would probably lead to an action between the respective capital ships, a conflict which we had throughout the war desired to provoke. If, on the other hand, the German main forces remained in their bases, and if we could gradually exterminate their lighter craft, mining operations close to the German bases, guarded from being swept up by our own vessels, could be carried out, and the submarine denied exit from North Sea ports. This was the idea governing proposals of this nature.

The weak point regarding the proposed mining operations close inshore was the fact that mines of the design then in existence could not be laid in water of a less depth than six fathoms, whereas a submarine could pass out, even at low tide, in water of a depth of three or four fathoms; a passage out would therefore always be left. The mines, too, laid in a tideway would have a considerable "dip" during the strength of the tide, which would allow light-draught vessels to pass over them in safety.

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As stated in the proposals the first essential for carrying out the suggested policy was the capture of a German island for use as a base for the small craft, which would be engaged in the inshore operations, and also as a base for air-craft.

Examination of the proposals led to the following opinions being formed: There were three islands, the capture of which had been considered at various times both before and during the war, namely, Heligoland, Borkum and Sylt. Of these, Heligoland, after capture, would give us a base which would be free from gun bombardment from the mainland, but it was obvious that, having captured it, we should find its defences destroyed and the harbour would be continually subject to a bombardment from ships of the High Sea Fleet, unless our own inshore squadron was able to remain in sufficient proximity to prevent this. There were considerable difficulties in the way of carrying out such a policy. Heligoland, too, would be subject to constant aerial attack by the Germans.

With regard to Borkum, we should expect to find its defences similarly destroyed, and the taking of this island had always been recognized—even by its keenest advocates—to be a very difficult task, occupying several days in its execution. The first consideration in regard to Borkum was whether after capture we could use the anchorages behind it as a base. It did not appear that this could be done, because, although these anchorages, owing to their distance from the mainland, were immune from howitzer fire, they were within reach of

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GERMAN SUBMARINES AT ZEEBRUGGE.

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long-range guns of all calibres, and would be subject to intense attack by air-craft. It was thus to be expected that, should we capture the island, the anchorages would be subjected to continual bombardment which would in a short time deny us their use. The only reply we could make to such a bombardment would be by fire from ships and monitors directed from air-craft—which could not possibly prove effective owing to the small size and the isolated position of the targets at which we should be firing. It was therefore considered that Borkum would not be suitable as a base, unless we could hold the mainland opposite the island.

In regard to Sylt, the same disadvantages were very much accentuated, owing to the island being so much nearer to the mainland.

There was this further consideration—that if we sealed the enemy's ports in the North Sea, it would only reduce the submarine menace and not abolish it, as the enemy would then use Kiel as a port of departure for the boats. This would, of course, increase the length of their passage to their fields of operation, but would not deny their exit. It did not appear possible to seal the Baltic exits, unless we could maintain a blockading force in the Sound and Great Belt. Such a force could only be maintained if we had disposed of the High Sea Fleet; or, alternatively, by the use of a base in the Kattegat, where we could keep a fleet capable of dealing with any force which might be sent against our blockading ships.

In addition to the difficulties which have been mentioned, it was a practical impossibility to carry out



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the operation of fitting bulges to the ships taken from the Grand Fleet. We had not the available docks in which to carry out the work.

It was also extremely difficult—in fact practically impossible—to find the necessary numbers of small craft required for a policy of a close blockade. In the autumn of 1917, the actual number of British light cruisers and destroyers was less than two to one as compared with Germany. These figures included all ships of this class employed on trade protection, and the withdrawal of all these would certainly have been necessary if the requirements were to be met.

Finally, the operation was dependent on our Allies agreeing to lend us the vessels needed to form the inshore squadron. I discussed the question with the United States and the French Naval authorities, and they stated definitely that they were not prepared to do this, which entirely disposed of the idea.

4. *The Mechanical Blocking of the Enemy's Bases.*

This was an Admiralty proposal. It was not one on which it was possible to express a sound opinion unless the matter was gone into in detail.

The objective was to establish a blockade of all the enemy's bases and to keep them blocked so that submarines could no longer get to sea. For this purpose the method proposed in the first instance, was to sink a line of concrete-filled ships across the deep water channels of the Jade and Elbe so that the High Sea Fleet would be blocked in. It was estimated that a total of

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29 old battle-ships and 42 old cruisers would be required. Merchant ships were unobtainable, as every vessel which we or our Allies possessed was essential for trade purposes.

Further, it was necessary first to capture Heligoland, and secondly to take and hold Wangeroog, as the batteries on Wangeroog commanded the projected block lines in the Jade at comparatively close range. The operations necessary for the capture of Heligoland and Wangeroog were examined and proposals drawn up. In each case the Grand Fleet would obviously be needed to cover the bombarding operations of the older battle-ships and monitors.

The investigations showed that the actual blocking operations would present many navigational difficulties, and that it would be almost impossible to prevent gaps in the block lines. Even after sinking the block ships successfully it would be necessary to maintain a force of capital ships in the vicinity capable of dealing with any attempt to make an exit for ships of the High Sea Fleet and to engage any such ships as could emerge successfully.

If the mechanical blocking of the High Sea Fleet succeeded, or, alternatively, if the High Sea Fleet put to sea to prevent being blocked in, and suffered heavy losses, the next operation was that of blocking in the submarines by mines. The length of the line to be blocked and the depth of water, prevented the use of anything but mines. It was estimated that over 20,000 would be needed. A line of mines could not be maintained in the shallow estuaries owing to the shore

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batteries, so that it was proposed to lay the mines between Heligoland and the mainland in each direction. If these operations succeeded, it would be necessary to block the Ems, after capturing Borkum, but the Baltic exits would still remain available for enemy use, as they could not be blocked without violating Danish and Swedish neutrality.

For these operations it was clear that we should require the assistance of our Allies, both in regard to the provision of ships for sinking in the German rivers, and for the operations leading up to this work. When the scheme was explained to the representatives of the United States, France and Italy, they stated that they could not provide the necessary ships.

Another offensive policy carefully considered was that of carrying out operations in the Baltic with a view to relieving Russia of the pressure of the German Fleet. This was examined in detail, but could not be recommended. The principal reason was that prolonged *occupation* of the Baltic was not practicable unless the High Sea Fleet was first put out of action, or unless the Elbe was blocked, and a sufficiently strong force sent to the Baltic to reinforce the Russian fleet, and to hold the Great Belt against the High Sea Fleet. An immense amount of mine-sweeping would be required and the ships guarding the Belts would be subject to heavy air and submarine attack by day and in narrow water, and to destroyer attack at night.

A *raid* into the Baltic, carried out with a view to bringing the High Sea Fleet out to face action in that

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sea, although practicable, was an operation involving the use of a fleet both in the Baltic and in the North Sea, since, in the absence of our fleet in the Baltic, the High Sea Fleet might, instead of facing us in the Baltic, emerge into the North Sea, cut off our communications with France and generally obtain control of our waters.

There was the alternative of endeavouring to force a passage through the Sound into the Baltic for submarines. This would have probably involved a loss of several destroyers, and in view of the conditions in Russia at the time, it was not considered desirable to send even submarines into the Baltic.

These various plans for offensive operations in 1917 have been mentioned in order to make it clear that every possible avenue through which the forces of the enemy could be rendered immobile or destroyed was considered in full detail.

If none of them were adopted it was because, after detailed consideration, they were found to be either impossible of achievement or that the attempt to carry them out might endanger our surface command of the sea.

During 1918 no change took place in the Admiralty policy, as regards offensive action of the nature discussed above, presumably because it was realized that none of the operations considered in 1917, nor any others that may have been under consideration in 1918, were feasible. The sole change in Naval War Policy in 1918 was that mentioned later of abandoning the idea of seeking action with the High Sea Fleet.

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## CHAPTER VI

### NAVAL CO-OPERATION WITH THE UNITED STATES

THE first steps in naval co-operation between the United States and ourselves took place on the entry of the United States into the war, a short time after the arrival in England of Admiral Sims of the United States Navy. From the moment of his arrival, he was in the closest possible touch with the Admiralty. He was an old friend of mine, and realizing the difficulty that the naval authorities in the United States might feel in appreciating at a distance of 3,000 miles the situation caused by the unrestricted submarine warfare, I gave Admiral Sims the fullest details of our losses in the Mercantile Marine since the introduction of unrestricted submarine warfare, and complete details as to our efforts to combat the growing menace.

I take the opportunity here of correcting Admiral Sims's account, in his book "The Victory at Sea," of an interview with me, shortly after his arrival in England, when the matter of the submarine attack on merchant ships was discussed.

As he states, I gave him full information on the subject in order that he should realize the danger. At the end of our conversation he inquired whether there was any solution for the problem, and he states in his



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book that my reply was "Absolutely none, that we can see now."

What I did say was that the counter measures being devised could not be immediately successful as time was required for their production. I then urged him to do his utmost to obtain fast small craft from the United States.

Admiral Sims very quickly realized the position, and both he and the United States Ambassador, Mr. Page, pointed out to the United States Government in the strongest terms the necessity of the earliest possible assistance being sent over to us in the way of destroyers and other fast small craft to deal with the situation. Admiral Sims, with the consent of the United States Naval Department, co-operated in the most whole-hearted manner with us, by placing under the command of British Flag Officers all United States war vessels sent to British waters. The result was a very strong feeling of comradeship between the two navies. No greater proof of this can be given than the frequent visits paid to the United States since the war by Admiral Sir Lewis Bayly, under whose command the United States destroyers at Queenstown were placed, and the welcome with which he is received on the occasion of each successive visit.

In August, 1917, Admiral Mayo, the Commander-in-Chief of the United States Atlantic Fleet, visited England. He, too, was furnished with full information as to our naval policy in general, our methods of trade defence and our system of convoy.

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Admiral Mayo had on his arrival asked for information as to the direction in which the United States could assist the Allied cause, and he was informed that the further assistance desired from the United States was:—

(1) Four coal-burning battleships of the Dreadnought type to replace 3 or 4 Grand Fleet Dreadnought battleships which it is desired to send to foreign waters to relieve older battle-ships which are being paid off, their personnel being required for other services.
(2) An increase in the number of destroyers, in order to enlarge the convoy system and to provide better protection for each convoy.
(3) An increase in the number of convoy cruisers for the same reason.
(4) An increase in the number of patrol craft, tugs, etc., for anti-submarine work.
(5) The rapid building of merchant ships.
(6) The supply of a large number of mines for the proposed barrage between Scotland and Norway, and assistance towards laying them by the provision of United States mine-laying vessels.
(7) Air-craft assistance.

As regards (1), it was mentioned that the increase in the number of light cruisers and destroyers during the war had forced us to pay off the older capital ships to provide trained personnel for the light cruisers, flotilla leaders and destroyers. This policy would still continue, as officers and crews would be required during the next

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18 months for the 19 light cruisers, 12 flotilla leaders and 119 destroyers then in various stages of construction.

Should the U.S. Government see fit to send over four coal-burning Dreadnoughts, Admiral Mayo was informed that they would be attached to the Grand Fleet and form an integral portion of it, working together as a Division of a Battle Squadron.

(2) The United States destroyers were more suitable for convoy work on the western approaches to Great Britain than British destroyers, owing to their size and greater radius of action. Any increase possible in this direction would, it was stated, enable more British destroyers to be used in the North Sea to operate offensively against enemy submarines. The total additional requirements of destroyers for convoy work alone was put at 55.

(3) An increase in the number of convoy cruisers would enable the number of convoys to be increased, or, alternatively, the number of merchant ships in each convoy would be reduced and better control and protection be assured. A total of 41 additional convoying vessels (cruisers or old battle-ships) was mentioned as being needed.

(4) The proposed barrage of mines between Scotland and Norway necessarily entailed the provision of large numbers of patrol vessels. Any assistance from the United States in this respect would be most welcome, either to co-operate in patrolling the barrage, or, alternatively, to release British patrol vessels for this purpose. The total requirements were given as:—

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48 destroyers or sloops.
128 trawlers.
80 motor-launches (110 feet).
20 tugs.

(5) At least 100,000 mines were required for the barrage, in addition to the British mines that would be used.

(6) Complete material and personnel for three large seaplane stations on the coast of Ireland was asked for: not fewer than 36 machines at each station.

Admiral Mayo was also informed as to our anti-submarine offensive policy, which was thus summarized:—

(1) *Trawler hunting flotillas.* At the time of his visit in September, 1917, we had established hunting flotillas of four trawlers working with air-craft from the coast in 12 of the 22 areas round the coast of the United Kingdom. These trawlers were fitted with hydrophones, and their utility, of course, depended upon the efficiency of the hydrophones and on the nature of the waters in which they operated. Trawlers were, unfortunately, handicapped in this work by their low speed. Prior to the introduction of a general system of convoy we used such destroyers and "P" boats as were available for hunting submarines, but these were necessarily included in the escort flotillas and the work left to trawlers.

*Motor-launch flotillas* were in operation at Portsmouth, Portland, Torquay and Newlyn in the Channel, and off the Tyne on the East Coast. These vessels

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were fitted with hydrophones, had a high speed of 15 to 18 knots, and were of value except that they were handicapped in bad weather owing to their build and small size.

*A North Sea hunting force* of 32 trawlers was being collected to work with any sloops that could be spared from convoy to endeavour to pick up enemy submarines going north-about to the Atlantic or homeward bound.

The hydrophone was by this time proving itself to be of considerable value.

Admiral Mayo was informed of our "Q" ships system, which at that time consisted of a large number of steamships, sailing ships, and small craft, some of which were fitted to tow submarines submerged.

With regard to the anti-submarine work by air-craft, Admiral Mayo was informed that an average distance of approximately 120,000 miles was flown over sea by air-craft each month, submarines being sighted at the rate of about one every two days. During the previous three months they had been attacked on many occasions.

Kite-balloons were also in use by destroyers, "P" boats and other small craft engaged in submarine hunting.

He was also told of the offensive operations of our own submarines. We had at that time three or four submarines lying off the north-west coast of Jutland, one or two on the line joining Hanstholm and the north point of the Shetlands, one or two in the vicinity of the Shetlands, either to the north of them or to the south in the Fair Islands Channel, and three or four between the parallels of latitude 55 and 57 North, spread across

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the lines usually taken by U-boats when proceeding into the Atlantic.

It had been ascertained that since the introduction of the convoy system some of the German submarines were acting near the approaches of the Bristol and English Channels and it was decided to transfer some of our Atlantic submarines to the same vicinity.

Admiral Mayo was also informed of our anti-submarine policy in the Heligoland Bight, and of our deep mine-fields laid in the North Sea and in the Channel. The following Table was given to him to show the offensive measures in use against submarines at the time of his visit. The Table gives a good summary of our anti-submarine measures:—

TABLE OF OFFENSIVE MEASURES.

| | *Remarks* | *Action* |
|---|---|---|
| 1. *Hydrophone Hunting Flotillas.* | (*a*) A hunting section of 4 trawlers in 12 selected areas. | (*a*) Personnel undergoing training at Portland for North Sea Flotillas. |
| (*a*) Trawlers. | 8 Sections (32 Trawlers in all) equipping for service in North Sea. One section of 4 Trawlers now in Channel approaches. | Channel Flotilla operating. |
| (*b*) Motor-Launches. | (*b*) 5 Motor-Launch Flotillas. Portsmouth (2), Portland, Dartmouth and Newlyn, 1 each (each flotilla 6 Motor-Launches). | (*b*) Operating off their respective ports. |

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TABLE OF OFFENSIVE MEASURES—*continued.*

| | *Remarks* | *Action* |
|---|---|---|
| 2. *Air Patrols.* Aeroplanes. Seaplanes. | (*a*) *East Coast.* 9 Stations, 110 machines. | 1. Used on patrol on chance of sighting hostile submarines and keeping them submerged. |
| | (*b*) *English Channel.* Portsmouth group. 5 stations, 31 machines. S.W. group. 7 stations, 49 machines. Riviera seaplane carrier attached to Plymouth Command carrying 4 machines. | 2. For hunting a submarine when sighted. 3. For escorting merchant ships. Air-craft for anti-submarine work carry delay-action bombs. |
| | *IRELAND.* 3 Large stations approved. | |
| Airships. | (*c*) *East Coast.* 5 Stations, 24 airships. *English Channel.* 3 Stations, 17 airships. *Irish Channel.* 2 Stations, 9 airships. | |
| Kite Balloons. | (*d*) Kite Balloon stations at various ports from which patrol vessels take them out for convoy work or submarine hunting operations. | |

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TABLE OF OFFENSIVE MEASURES—*continued.*

| | *Remarks* | *Action* |
|---|---|---|
| 3. *Submarines.* Diving Patrols against hostile submarines. | Flotillas (13 boats) E. D. & H. class on West Coast of Ireland for Atlantic Patrol.<br>Remainder on East Coast consists of 52 boats, E. F. G. H. J. V. & C. class for North Sea patrol.<br>5 E Class submarines are also employed on mine-laying in North Sea. | Extensive diving patrols carried out in the endeavour to intercept hostile submarines on passage according to the latest information at the disposal of the Admiralty as to courses they follow and the areas in which they are active. |
| 4. *Coastal Motor-Boats.* For hunting submarines. | 12 40-ft. boats at Dunkirk for raiding Belgian Coast bases.<br>56 55-ft. boats, speed 34/38 knots, carrying one 18/torpedo, 4 "D" depth-charges and a Lewis Gun.<br>28 of these boats are allocated for operating against enemy submarines in the Channel area, the remainder being at Dover. | Base being established at Portland as head-quarters for 20 boats for anti-submarine operations in the Channel.<br>Sub-bases will be established at other Channel ports for submarine hunting. |
| 5. *Decoy Ships.* Steam and Sailing. | Large.—<br>Convoy Sloops . 11<br>P.Q.s . . . 10<br>Qs . . . 18<br>Small—<br>Steam Trawlers . 19<br>Steam Drifters . 2<br>Motor Drifters . 3<br>X Lighter . . 1<br>Sailing Vessels—<br>13, including 3 Brixham trawlers. | |

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TABLE OF OFFENSIVE MEASURES—*continued.*

| | *Remarks* | *Action* |
|---|---|---|
| 6. *Decoy Ships.* Supported by submarine. | Submarine submerged keeping at a distance of about half a mile from the Decoy Ship. | 1 on North Coast of Ireland with sailing ship decoy.<br>1 on South Coast with a steam ship decoy. |
| 7. *Mining.* Mining on routes of German submarines by submarine and surface mine-layers. | This has been done to a large extent, position of laying mines depending on latest information at disposal of Admiralty; depth setting being also determined by information as to where submarines proceed on surface and where submerged. | |
| 8. *Depth-charges.* Increasing supply of depth-charges and fitting these to explode at greater depth. | Four depth settings 50, 100, 150, and 200 feet. 3 types containing 300 lbs., 120 lbs., and 40 lbs. of explosive. | Output increasing 1,200 a month at present and working up to 4,000 a month D. and D.* |
| 9. *Hydrophones and Magnetophones.* Moored and used from shore stations. | *Shore Hydrophone Stations.*<br>9 stations established.<br>8 stations being established.<br>7 further stations suggested, not yet approved.<br>*Magnetophone Stations.*<br>1 in each big mine-field. | Work of laying cable continues as rapidly as possible. |

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TABLE OF OFFENSIVE MEASURES—*continued.*

| | *Remarks* | | | *Action* |
|---|---|---|---|---|
| 10. *Depth-charge Throwers.* | Type "D" depth-charge throwers, 1312, 300 lbs. | | | Being fitted as delivered in Trawlers, "Q" ships, and Merchantmen. Fitting in other classes of ships under consideration. |
| *Bomb Howitzers.* | | *No.* | *Burster.* | |
| | 13.5" Bomb Thrower | 1 | 100 lbs. | |
| | 200 pr. Bomb Thrower | 80 | 94 lbs. | |
| | 7.5" Bomb Thrower | 50 | 43 lbs. | |
| | 6" Newton Bomb Thrower | 3 | 25 lbs. | |
| | 11" Howitzers | 210 | 133 lbs. | |
| | 10" R.M.L. Howitzers | 750 | 100 lbs. | |
| | 7.5" Howitzers | 1,000 | 43 lbs. | |
| | 5" Howitzers | 12 | 11 lbs. | |
| 11. Increased depth of High Speed Sweep. | Experiments being conducted to obtain a depth of 200 ft. | | | |
| 12. *Circling Torpedo.* 18" and 21" | Runs in a circle of 200 yards diameter and at a depth of 80′ to 100′. | | | Approved to be carried and form half the torpedo armament of destroyers employed on anti-submarine work, which are not likely to meet hostile destroyers. |

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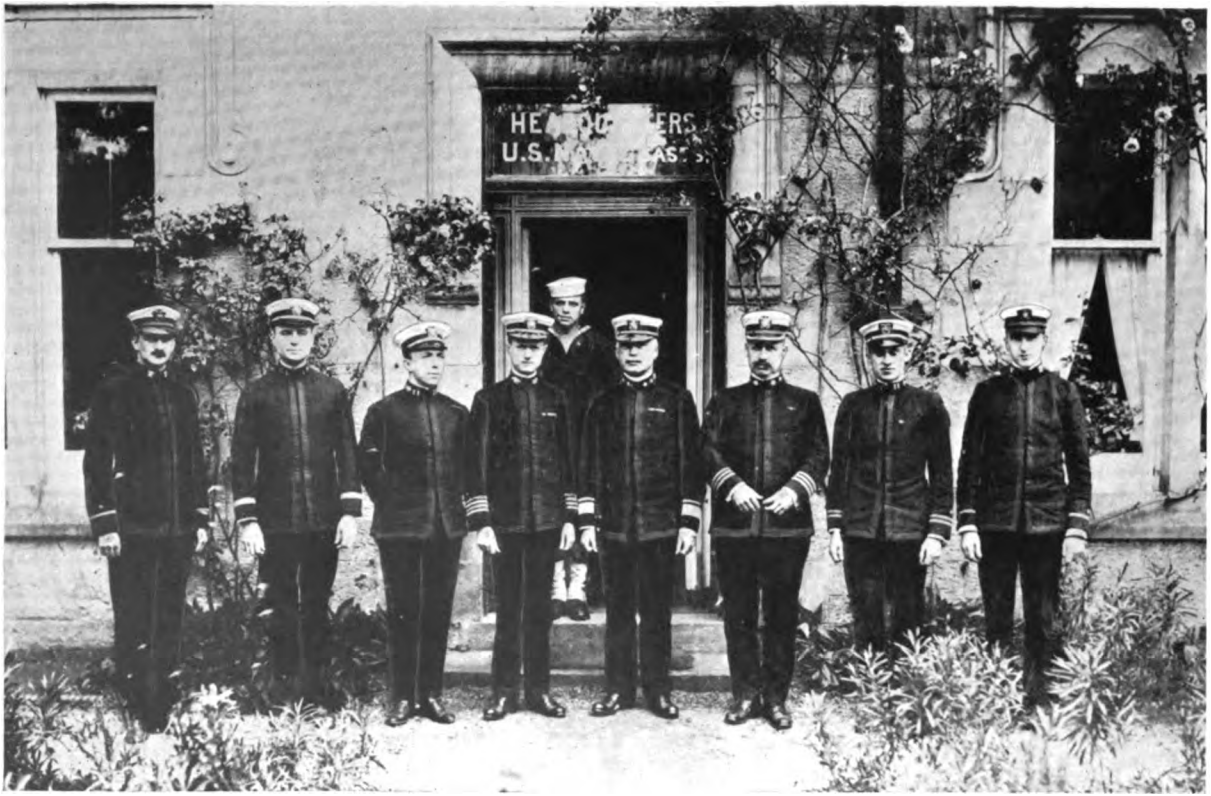

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ADMIRAL STRAUSS OF THE U.S.A. NAVY, AND STAFF IN FRONT OF HEADQUARTERS, INVERNESS, SEPTEMBER 17, 1918.
Admiral Strauss was in charge of the U.S. mine laying operations.

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In regard to our anti-submarine offensive policy in the future, Admiral Mayo was informed that our efforts would be largely devoted to measures designed to prevent the egress of German submarines from the North Sea, pending the institution of any measures that could be devised to prevent their egress from their actual ports. So far as the blocking of their passage to the English Channel was concerned, mention was made of the future policy of mining the Straits of Dover against submarines when the new pattern mine was available in sufficient numbers. This "ladder" mine-field was first suggested by Admiral Sir Reginald Bacon in February, 1917, and the Folkestone-Griz Nez line for the mine-field was chosen. The portion of the Channel to be mined was re-surveyed, when the supplies of the new pattern mine were in sight about September, 1917; the work was commenced in November and practically completed by the end of the year. This mine-field accounted for some seven submarines in 1918.

In regard to air-craft, Admiral Mayo was informed that our naval programme was directed towards establishing 36 large "Americas" at Peterhead, 36 at Scapa and 36 at Lerwick. It was mentioned that this project would tax British resources very heavily, and it was suggested that the air stations on our Atlantic coasts should be brought up to the necessary standard of anti-submarine efficiency by machines and personnel from the United States.

Admiral Benson, the Chief of Operations in the United States Navy Department, visited England later



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in 1917. He approved of the request which I had made to Admiral Mayo for four coal-burning battle-ships, and these ships, under Rear-Admiral Rodman, joined the Grand Fleet as a battle-ship division in December, 1917.

Further co-operation took place on the administrative side. Admiral Sims himself attended many of the meetings of the Board of Admiralty when naval operations were being discussed. I had mentioned to Admiral Sims that it would be of great value if United States naval officers were sent over to work in the Admiralty in the various departments, and Admiral Benson, after discussing the matter with me, approved of this course being taken.

By the end, therefore, of 1917, co-operation between the two Navies was absolutely complete, and there can be no question of the great value which resulted from the adoption of this course.

In closing this chapter, I feel it is right to put on record the great admiration which we in the British Navy felt for the spirit of self-effacement displayed by senior American naval officers in placing themselves so unreservedly under the command of British naval officers, in order to ensure unity of control in British waters. They recognized that we had the experience of the previous years of the war behind us, and that fact, no doubt, influenced their action. It did not lessen our admiration for their decision.

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# CHAPTER VII

## ATTACK ON SUBMARINE BASES

IN the foregoing chapters mention has been made of the steps taken, or methods investigated, for dealing with the German submarines at sea, and for preventing their exit from North Sea bases. The question of preventing their exit from Zeebrugge (the harbour from which those in that locality put to sea, after leaving their base at Bruges), and those leaving from Ostend, had been before the Admiralty from the early months of the war. Those places were used by German destroyers and submarines after the Belgian coast had been occupied by the German Army. As far back as January, 1915, the Admiralty had pointed out the very great risk of attack to which our cross-Channel communications with France were exposed from vessels based on these ports, and had strongly urged the adoption of a proposal by Sir John French to take offensive action with the object of driving the Germans out of these bases. Proposals had been put forward on more than one occasion for an attempt being made to block the exits from Ostend and the exit to the Bruges Canal leading to Zeebrugge, and finally Mr. Asquith's War Cabinet had stated in November, 1916, before I joined the Admiralty, that it was considered of great importance either for us to occupy Ostend and Zeebrugge, or alternatively to deprive the enemy of the use of these ports.



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In the early part of 1917, General Nivelle's plan for breaking through on the Western Front had been approved by the British and French Governments, after conferences in London and Calais. It was originally intended by the British Prime Minister to place the British troops under General Nivelle's supreme command, as stated in Sir William Robertson's book "Soldiers and Statesmen," Vol. II, p. 207. This arrangement had been made by Mr. Lloyd George without any consultation with Sir William Robertson or Sir Douglas Haig. Under a revised arrangement Sir Douglas Haig was subordinated to General Nivelle for the period of Nivelle's offensive only. The French attack failed and the failure led to a serious situation. There was great depression in both the French army and nation, and serious disaffection arose in some portions of the army; the conclusion was then reached that it was necessary that some successful military operations should be carried out by the British army, in order, firstly to prevent a German attack on the French front, and secondly, so as to withdraw some of the German reserves from that front, whilst the French army was recovering its morale. Such action would put fresh heart into the French army and nation.

At a conference held in Paris on May 4, between Generals Pétain, Nivelle, Sir W. Robertson and Sir Douglas Haig, it was decided to continue offensive operations on the Western Front. The British Prime Minister announced his readiness to support the recommendations, and the French agreed to co-operate. A

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decision was arrived at to continue the offensive on the Western Front in accordance with the principles agreed to by the Generals—and to devote the whole of the forces to this purpose.[1] It was unfortunate that but little assistance was able to be rendered by the French army.

When the operations were first designed and commenced, the weather was fine and the prospects appeared promising. Great delays occurred, however, in starting the operations owing to various discussions which took place in June and July, and nothing definite took place until the third week in July.

As mentioned by Admiral Bacon,[2] approval had been given, after a trial of his proposals, of the very ingenious plans drawn up by him for a landing in force on the Belgian coast near Westende, with a view to turning the extreme northern flank of the German line and for the eventual capture of the German submarine and destroyer bases at Bruges, Zeebrugge and Ostend. Sir Douglas Haig, although prepared to approve of this landing, was opposed to carrying out the operation until the British line had arrived as far as Roulers during its advance from Ypres through Passchendaele. The first division of Sir Henry Rawlinson's Fourth Army, 14,000 strong, was encamped between Dunkirk and Calais ready to carry out the landing when the conditions permitted.

For the success of the landing operation secrecy and

[1] "Soldiers and Statesmen," Vol. II.

[2] "The Concise Story of the Dover Patrol."

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surprise were essential features. The troops detailed to take part in it were located in what was termed a "quarantine camp" at Le Clipon, and the monitors, pontoons and rafts from which the troops were to be landed, were moored in the Swin at the entrance to the Thames, and were under the strictest arrangements to prevent any idea leaking out as to the use to which they were to be put. So far as I can recollect, even the War Cabinet was not informed till a very late date of the actual arrangements, as a further precaution to ensure secrecy.

In view of the military operations in course of procedure, the Admiralty policy was to await the result of these operations, which it was hoped would allow of the landing taking place by August or September at the latest, before taking any further decisive action against the submarine bases, beyond the bombardments carried out as frequently as possible against Zeebrugge and Ostend by the monitors of the Dover Patrol, and the bombing of these bases by air-craft of the Royal Naval Air Service at Dunkirk. At a meeting in August, however, the Prime Minister suggested to me that if naval bombardments of Ostend and Zeebrugge were carried out more frequently and on a more intense scale, the use of these ports could be denied to the enemy, with the result that the military operations might be affected and be no longer necessary. I pointed out to him that, although annoyance, inconvenience and some damage were caused to the enemy by sea and air operations against Ostend and Zeebrugge, no

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permanent result could be achieved by them, because, whilst we could make these two harbours temporarily untenable during a bombardment, we could not do any permanent injury to the harbour as a harbour, but merely to floating docks, workshops, etc. During the bombardment vessels using these harbours would leave them, returning when the bombardment was over. Both Zeebrugge and Ostend were connected with Bruges by canals. It was further mentioned that the German vessels only lay in Zeebrugge harbour on rare occasions, being usually at Bruges, and that the only way of effecting serious injury was by damaging the Zeebrugge lock gates by gun-fire, so as to prevent their use. This, owing to the exceedingly small target and the range at which bombardments had to be carried out, was an operation requiring a prohibitive expenditure of ammunition. It was also mentioned that the Germans were constructing new lock gates higher up the canal in a position unknown to us. As for Bruges, no naval bombardment from guns possessed by us at the time could reach it. Admiral Bacon had, however, in mind the idea of mounting 18-inch guns in monitors for the purpose of shelling Bruges.[1]

As a matter of fact our bombardments of Ostend did have the effect by the end of October, 1917, of causing the Germans practically to cease the use of Ostend as a harbour, and their vessels were mostly kept at Bruges or occasionally at Zeebrugge. This did not, however, seriously interfere with their operations.

[1] "The Concise Story of the Dover Patrol," p. 111.

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During our bombardment by monitors—which had to be carried out at very long ranges, exceeding 25,000 yards, the fire being directed by air-craft—the monitors themselves were subjected to return bombardment from the heavy guns of the shore batteries, and also to severe aerial attack. It was most difficult to carry out these operations very frequently, as they were entirely dependent upon a combination of favourable weather conditions. Low clouds prevented aerial spotting; a favourable direction of the wind was necessary to work our smoke screen, etc. The enemy had also learned the advantages of a smoke screen from us and had taken to shrouding the docks completely in smoke after the start of a bombardment. This prevented our observation of the shell-bursts from the air. We also had to consider very seriously the life of the guns, of which we had an insufficient reserve. All this is dealt with fully in Admiral Bacon's book.

A suggestion was made to me by Mr. Lloyd George that the Grand Fleet should be brought down to bombard these two ports. That was a proposition which needed little argument to cause it to be negatived.

The Royal Naval air-craft working from Dunkirk under the direction of Captain Lamb, R.N., were constantly carrying out bombing attacks against Zeebrugge. During September, 1917, a total weight of 86 tons of bombs was dropped by the Dunkirk naval air-craft on enemy objectives. It might have been due to these attacks that the German destroyers frequently left

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Bruges during the autumn and moored at Zeebrugge. This we ascertained by aerial photographs.

Having ascertained this, Sir Reginald Bacon laid plans for a combined naval and aerial night operation. The air-craft bombed Zeebrugge heavily in the vicinity of the Mole in order to force the enemy destroyers to proceed out of the harbour. Some of our coastal motor-boats were sent to lie off the mouth of the harbour and attack the German destroyers as they came out, and on the first occasion the operation was carried out one destroyer was sunk and another damaged, if not sunk, by the torpedoes fired by coastal motor-boats.

As is well known, the advance of the British army on the Passchendaele front was so held up by the heavy rains, that the attempted landing on the Belgian coast was eventually abandoned, Sir Douglas Haig informing me of this decision in October, 1917.

The position is thus described in Vol. I of Sir Douglas Haig's dispatches:

At the end of July the weather became threatening. It then rained continuously for four days and the weather remained stormy and unsettled for some days afterwards. Towards the middle of August there was a slight improvement. Bad weather then again set in, and the month closed as the wettest August that had been known for many years. At the beginning of September the weather gradually improved, but rain started again on the 19th and 20th of September, and early in October fell heavily for several days.

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According to Sir Douglas Haig's dispatches, the question of our military policy in France in the immediate future was carefully considered at the end of September. The persistent bad weather had made movement inconceivably difficult; and, although the delays thus caused gave the enemy time to bring up reinforcements, it was the difficulty of movement on our part more than hostile resistance, which continued to limit the progress of our army, and made it doubtful whether the capture of the Passchendaele Ridge, before winter finally set in, was a possibility.

Sir Douglas Haig states that, on the other hand, there was no reason to anticipate an abnormally wet October; and, as encouraging information was in his possession as to the effect of our operations on the enemy, Sir Douglas decided to continue them. Unfortunately, his hopes for a fine October were not realized, and the condition of the ground continued to deteriorate. Consequently, by October 12 it was decided not to persist in the advance towards our more distant objectives, although it was still hoped to progress as far as Passchendaele, of which possession was eventually gained by November 6.

So far as the object of these operations is concerned, Major-General Sir John Davidson, M.P., in his speech in the House of Commons on August 6, 1917, gave an account of the reasons which led to continuing the Ypres offensive. This speech is summarized as follows in Sir Douglas Haig's dispatches:

1. Since the breakdown of their July offensive the Russian army had ceased to be a fighting force.

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2. The fighting capacity of the French armies was at this time very seriously diminished by grave internal troubles.

3. The solidarity of the Allied front in the West was jeopardized by the great reverse suffered in October, 1917, by the Italian armies.

4. America was not yet in a position to give any assistance on land.

5. The Russian collapse had set free large hostile forces which were rapidly being transferred to the Western Front.

6. The only Allied army capable of conducting serious offensive operations at this time was the British.

7. If the British offensive ceased the enemy could regain the initiative and be free to attack wherever he thought the Allied line weakest. The conditions of our Allies at this time were such that it was impossible to accept this risk while any alternative remained.

8. It followed that the British must continue to attack until the coming of winter put an end for a time to the danger of a German counter-stroke.

9. The German submarine campaign was at its height. Our own Admiralty were anxious about our communications across the Channel so long as Ostend and Zeebrugge remained in the enemy's hands.

Admiral Bacon had proposed to Sir Douglas Haig, earlier in the operations, that should Roulers not be reached, a modified operation should be carried out, the coast being seized from Middelkerke to Nieuport, the German guns mounted there destroyed, and naval

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guns landed to fire at the Zeebrugge locks and the Bruges dock; Sir Douglas did not, however, agree.[1]

When this position was reached thoughts turned once more to a naval attack on Zeebrugge, and Admiral Bacon placed his detailed proposals for an operation of this nature before me early in December, 1917. I requested him to enlarge his scheme, so as to include blocking operations, and this he accordingly did. Meanwhile, the Plans Division of the Naval Staff at the Admiralty had drawn up ideas for blocking Zeebrugge and Ostend and these were sent to Admiral Bacon who, as mentioned on page 224 of his book, criticized them severely, whilst including in his own proposed operation a scheme for blocking Ostend at the same time as Zeebrugge, as suggested in the Admiralty paper. His arrangements were approved finally by me in the middle of December.

The actual operation was carried out with great gallantry in April, 1918, under the command of Sir Roger Keyes, who had succeeded Admiral Bacon at the end of 1917. Sir Roger introduced some modifications in Admiral Bacon's original proposals, as is mentioned in the latter's book.

Admiral Bacon had always insisted, when I discussed this question of blocking the Zeebrugge Canal, that no such operation could really close the mouth of the canal, owing to the great rise and fall of tide, and the fact that the channel at the bow or stern of the block ships could be dredged, or a passage cut through a portion of

[1] "Concise Story of the Dover Patrol," page 203.

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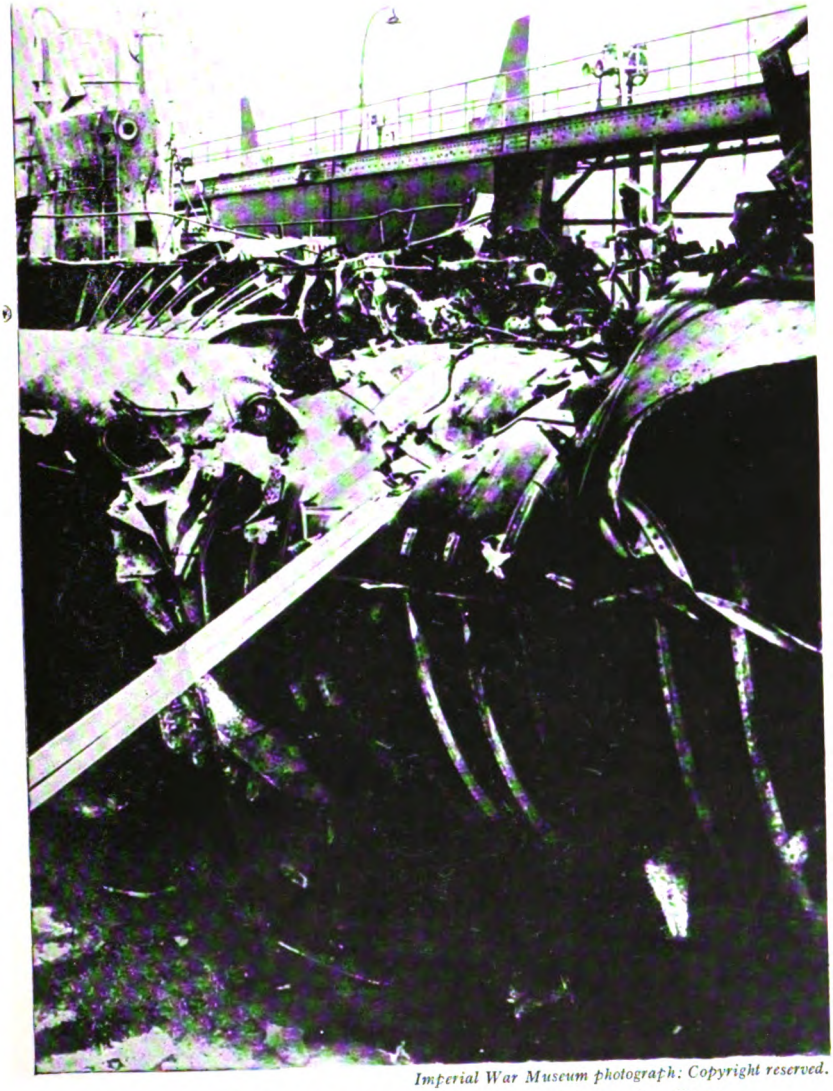

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GERMAN SUBMARINE DAMAGED DURING A BRITISH AIR-RAID ON BRUGES DOCKS.

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the block ship sufficiently for submarines to pass over. Whilst there could be no question whatever that the very gallant operation carried out by Sir Roger Keyes against Zeebrugge had a great psychological effect, it is nevertheless a fact that Sir Reginald Bacon's opinions of the blocking operations were shown to be correct by the fact that within two days of the attack a German submarine came out past the block ships.

During the discussions which took place at War Cabinet meetings on the subject of Zeebrugge and Bruges, I made no secret of the continued Admiralty view of the importance of preventing the use of these bases by the German destroyers and submarines. It was pointed out that their occupation by us would assist materially to ensure the security of cross-Channel communications and our trade with Holland, and would release vessels badly needed for service elsewhere.

Mention was made of the fact that up to date, the enemy did not appear to have realized the enormous damage their destroyers could effect in a concentrated attack upon our Channel shipping and on the vessels awaiting examination which were anchored in the Downs and the approaches to Sheerness. If such an attack were well planned and well carried out, at the maximum strength which the German bases could accommodate, the result might be very serious indeed. It was also pointed out to the Cabinet that by the winter of 1917 *it would certainly be necessary to reinforce the Dover Patrol if these bases were still in the possession of the enemy.* Our Dover Force had never been adequate for the work

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which it was required to carry out. The vessels comprising it had to be constantly on patrol awaiting the selected moment when the Germans, in full force, might attack with destroyers, or attempt to pass raiding vessels through the Narrows. The result was naturally that at any one selected moment the Germans could bring a very superior destroyer force for raids into the Channel. Admiral Bacon describes in Chapter VII of his book, the exceedingly hard work which the vessels of the Dover Patrol, and especially the destroyers, had to carry out, owing to the necessity for this constant readiness to repel attack. He recounts the amusement caused in the vessels of the Sixth Flotilla, when the captain of a destroyer, arriving from another command, "asked permission to let fires out," the practice in the destroyers of the Dover Patrol being to have steam on their engines for seventeen days in succession, followed by three days in harbour for boiler cleaning.

### The Shipping Situation in 1917

During the meeting at which future war policy was considered in the middle of 1917, as mentioned on page 19, the Cabinet called upon the Shipping Controller for a forecast of the expected estimate of the shipping situation at the end of 1917.

The estimate prepared indicated that we should be unable to supply the needs of our own population, those of our Allies, and of our overseas expeditions after the end of the year.

The estimate was based on the assumption:—

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(1) That the rate of loss of British shipping continued to be the same as that which occurred in May of that year, and which, as a matter of fact, was considered to be a rather low estimate.

(2) That the output of new shipping came up to expectation.

(3) That we could carry on successfully on a rather low estimate of imports.

If these figures could be accepted as correct, they furnished another strong argument for the capture from the Germans of the submarine base at Bruges, since much of the damage done to our shipping was due to the mine-laying and other submarines based at that place. Personally, I could not, of course, offer an opinion as to the shipping requirements, nor the output of new ships, but I could express a reasoned view as to our probable losses. Our total losses from May to December inclusive, actually reached 2,362,000 tons as against the estimate of 2,500,000 tons. It will be seen that the situation was, therefore, according to the Ministry of Shipping estimate, decidedly serious.

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# CHAPTER VIII

## THE CONVOY SYSTEM

THE question of the introduction of a general convoy system for the protection of merchant ships entering the submarine zone in the vicinity of the British Isles will now be discussed. This matter was receiving constant consideration at the Admiralty in the early part of 1917, but the objections to it were, until a later date, far too strong to admit of its adoption. Convoy on a small scale had been in operation since 1914, principally in connexion with troop-ships from Canadian ports, and vessels bringing home troops from Australia, New Zealand and South Africa, which called at Sierra Leone. These convoys usually comprised from three to seven vessels escorted on the ocean voyage by a cruiser or armed merchant ship, and through the submarine danger zone by some destroyers. Similar escorts were provided for outward-bound troopships. It had been essential to provide these escorts for vessels carrying troops because they were liable to be sunk at sight. The introduction of a system of general convoy for all merchant ships was, naturally, a very different problem from that of convoying occasionally a few troopships.

In considering this question it is desirable in the



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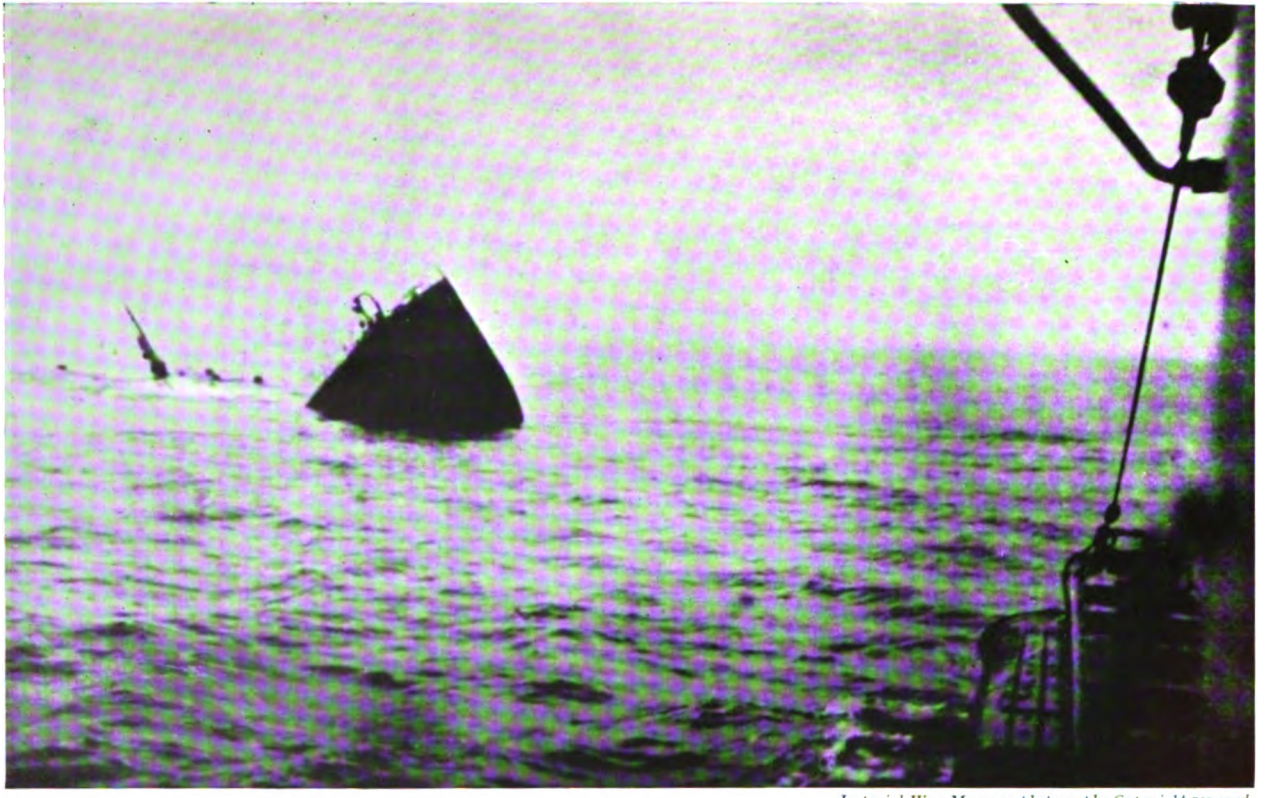

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MERCHANT SHIP SINKING AFTER BEING TORPEDOED.

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first place to point out the disadvantages and difficulties incidental to any general convoy system. They may be divided into:—

1. The mercantile disadvantages.
2. The Naval difficulties with which the Admiralty was faced at the time.

### 1. Mercantile Disadvantages

(*a*) One great mercantile disadvantage is the inevitable time wasted in collecting, after loading, a large number of vessels at a port of assembly, this collection naturally causing delay to ships which are ready first. Before and during the Napoleonic Wars, complaints of delays in ships making their voyages under convoy were very constant and very loud, largely because of the waste of time involved in *collecting* the convoy.

(*b*) Again, the necessity for the ships in a convoy being kept together throughout the passage from the port of assembly to the port of destination and not only through the submarine zone, *adds greatly* to the delay, because the speed of the convoy naturally becomes the speed of the slowest ship.

(*c*) Another disadvantage is the congestion in unloading caused at the port of destination by the simultaneous entry of a large number of ships. In spite of this the time occupied in the "turn round" of ships was eventually enormously decreased owing to the control exercised by the Ministry of Shipping with the cordial co-operation of shipowners. Without this control the delays would have been a very serious matter.



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(*d*) As regards other difficulties, many merchant ships were not fitted with any arrangements by which they could readily be darkened at night, by adequate coverings for port-holes or scuttles, or arrangements for dimming navigation lights. It was of course essential that no lights should be shown.

(*e*) The difficulty of merchant ships under convoy keeping the necessary close station to enable escorting craft to protect them from submarine attack was obvious and was a matter of the very first importance. Many merchant ship captains, commanding both large vessels and tramp steamers, who were consulted stated that, in their opinion, they could not keep their ships in close station because they had neither the requisite appliances in the way of revolution indicators, telephones, etc., between bridge and engine-room, nor the necessary skilled officers for this purpose, many of the best officers having joined the Royal Navy. Their opinion was on the whole justified. It certainly could not be ignored when the safety of valuable ships, their vital cargoes, and the lives of the crew were involved.

On this subject of ships in company keeping station, importance had of necessity to be attached to the views of those on whom the responsibility of station-keeping would lie or who had had experience of it. Civilian opinion was valueless. Naval officers who had seen much service in fleets well knew that, even under the most favourable conditions of weather, station-keeping in men-of-war was not always performed with accuracy. Those who had had experience of serving in fleets

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exercised under war conditions without lights at night or steaming in a dense fog, knew of many occasions on which ships became very seriously out of station. I remember early in the war, seeing a whole squadron lose complete touch with the rest of the Fleet, on an occasion when the Grand Fleet was at sea for one or two successive days in dense fog. People with a knowledge of the weather experienced in the Atlantic Ocean know that it is by no means rare to pass two or three days consecutively in dense fog.

There was also the question of bad weather to be considered in connexion with merchant ships. This particularly affects a lightly loaded ship so far as station-keeping in company is concerned. People who perhaps saw, during the war, a convoy nearing Home waters in fine weather, keeping good station, would no doubt lose sight of the above-mentioned facts, and might well assume that station-keeping by ships of the Mercantile Marine was a very easy matter.

When later experience showed that the difficulties anticipated by skilled and experienced officers of the Mercantile Marine were somewhat exaggerated, or at any rate were partially overcome, some people who had advocated the introduction of a convoy system at a time when no adequate escorting anti-submarine force could be provided, failed to appreciate that their advocacy had been premature. Had the system been instituted earlier than was the case, I have no hesitation in stating that the results might well have been disastrous. Convoys with an insufficient escort in the submarine

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zone would have been an easy prey to the enemy; depth-charges were very scarce and the officers in the ships composing the convoys would not have had any training in station-keeping. Later on, after the United States entered the war, we could assemble convoys in U.S. ports, and this enabled us to give at least a week's practice in station-keeping before entering the submarine zone.

Were proof of the difficulty of station-keeping in convoy needed, it is supplied by the very frequent reports received from the Admiral commanding the Orkneys and Shetlands of the bad station-keeping by British merchant ships in the Scandinavian convoys. Even as late as February, 1918, in spite of the experience then gained, it was found necessary to issue the following circular letter to shipowners, in which attention was drawn to the fact that Senior Officers of Escort on both the Atlantic and Scandinavian routes reported adversely on the station-keeping of British ships.

CIRCULAR TO SHIPOWNERS.

Station-Keeping in Convoy.

It has been brought to the notice of the Admiralty that an unduly large number of British vessels in Convoy, on the main and Scandinavian routes, are adversely reported on by Senior Officers of Escort, principally with regard to their station-keeping, whereas Danish and Norwegian ships are much more satisfactory in this respect.

The masters do not appear to realize the importance of keeping up in proper formation, and there is a very general tendency to drop astern during the hours of darkness. Possibly this is due to nervousness or inexperience of the

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officers of the watches, or failure on the part of the engineer-officers of watches to maintain constant revolutions. But, whatever be the cause, great improvement in the matter of station-keeping is urgently called for, as with the limited number of destroyers and other escort craft available, it is impossible to afford efficient protection to a Convoy scattered over an area of several miles.

Many cases have already occurred of ships being attacked through slackening speed and getting astern of Convoy, more especially during the night and at daybreak, and it is certain that the number of such attacks will increase if the enemy be given the same number of opportunities as in the past.

Owners are therefore requested to impress the importance of accurate station-keeping on their masters, and to inform them that they must give this most important subject their very urgent and personal attention, as failure to do so endangers the lives of the crew of the vessels as well as the ships themselves, and no precaution must be neglected to preserve the tonnage on which Great Britain depends.

It is to the eternal credit of the Mercantile Marine that after convoy had been introduced, the officers of that great service did, as a whole, rise to the occasion and make a great success of it.

### Naval Difficulties

From the Naval point of view there were many difficulties.

The *first* was the necessity for the provision of a large number of vessels for the command and protection of the convoys from the port of assembly up to the submarine zone. In the early part of 1917 we had nothing approaching a sufficient number of cruisers, or vessels of any other type, to bring the convoy from Canadian waters to the edge of the submarine zone.

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The *second* was our entire inability to provide the necessary escort of fast vessels to guard the convoy through the submarine zone. Unless we could depend upon the ships in convoy being able to keep closed up in good station, a very large number of fast vessels for escort would be required.

*Thirdly*, until America entered the war, we could not use American ports as ports of assembly for the convoy. Our only alternative then would have been to assemble the ships of a convoy at a sea rendezvous well outside the submarine danger zone; such an arrangement presented obviously grave navigational difficulties and much danger.

*Fourthly*, we could not land in America the necessary staff for organizing and assembling the convoys. (It may be noted in this respect that before the United States entered the war our defensively armed merchant ships were not allowed to enter U.S. ports.)

*Fifthly*, a considerable danger of the convoy system from the Naval point of view was that due to mines in pilotage waters. It is obvious that very heavy losses would be incurred were a *convoy* to enter a mine-field as compared to the losses in the case of the entry of ships singly into such a field. This danger became lessened in the early part of 1917 owing to improvements effected in our mine-sweeping service, and the introduction of "Otters." Mine-sweeping work required a very large force of vessels. In July, 1917, we had 530 mine-sweepers at work, exclusive of paddle-sweepers.

What largely escaped the notice of many advocates of the introduction of a convoy system early in 1917

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was that, with the single exception of the provision of "ocean escort" vessels, *none of the foregoing naval difficulties existed in the old days of convoy during, say, the Napoleonic wars.*

Finally, another matter for serious consideration was the danger of heavy loss through attack by a force of surface vessels superior in strength to the ocean escort. Such attack is always open to an enterprising enemy and although the Germans for some reason never attempted an attack on the Atlantic convoys, they did make two successful attacks by surface vessels on the Scandinavian convoy towards the end of 1917. These resulted in very heavy losses in the convoy. In April, 1918, the whole High Sea Fleet put to sea in support of another attack on that convoy which, however, did not eventuate, owing to the breakdown of one of the German battle-cruisers and to Admiral Scheer not apparently having correct information of the dates on which Scandinavian convoys sailed.

An Admiralty staff paper entitled "Remarks on Submarine Warfare" which had been in the course of preparation for some time prior to my arrival at the Admiralty in December, 1916, was issued in January, 1917. I do not think this paper came before me personally. In one portion of it the objections to a general convoy system were stated, and preference was given to ships sailing singly, escorted as necessary, and the advantage possessed by a defensively armed merchant ship of good speed against a submarine attacking on the surface was emphasized. The paper had, of course,

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been written before unrestricted submarine warfare was in operation, and the conclusions reached were largely inapplicable to this method of attack.

Here it will be of interest to mention the facts relating to the adoption of a system of convoy for the Scandinavian trade. In December, 1916, a system of "protected sailings" was instituted, the protection being afforded by such Grand Fleet destroyers as could be spared from their Fleet duties. As the result of communication between the Admiralty and the C-in-C Grand Fleet a conference on the question of the best means of affording protection to the vessels engaged in the Scandinavian trade was assembled at Long Hope in the Orkneys early in April, 1917. This conference reported in favour of the adoption of a system of convoy for the Scandinavian trade. In forwarding the report the Commander-in-Chief of the Grand Fleet, Sir David Beatty, whilst expressing himself in favour of a convoy system for this trade[1] stated in the course of his remarks that:

The conference unanimously agreed that a system of convoys should be tried, but the representatives were unable to state whether the necessary vessels could be spared from their respective areas. It may be expected that the Officers in Command at the various Bases will be loath to release auxiliary patrol vessels and destroyers for the purpose required, working as they do at present in watertight compartments with responsibility only for their particular patrol area. It must, therefore, be for their Lordships to decide whether the present system could continue, or whether resources along the East Coast

[1] I have seen statements to the effect that Sir David Beatty expressed himself in favour of a *general convoy system* on this occasion. This is quite incorrect. All reference was to the Scandinavian convoy alone.

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should be pooled and strong escorts provided for regular convoys.

One or two destroyers are an essential feature of an escort for a convoy; these vessels are fast, they force submarines down, they can steam round a convoy keeping it closed up and they have efficient W/T communication. The latter is most important.

The difficulty is to find the destroyers; it is recognized that only a limited number of vessels are available for the protection of trade along the East Coast, and destroyers from the Grand Fleet cannot be utilized except on certain occasions, e.g. when proceeding to and from the Tyne for refitting purposes.

It is considered that the Seventh Flotilla, now based on the Humber and Tyne, should form the bulk of the escorting flotilla; occasional destroyers may be available from the Local Defence Flotillas at Rosyth and Cromarty, but I cannot recommend denuding these ports entirely of local defence destroyers. They are Naval Bases, and as such are on a different footing to the Tyne and Humber, it would therefore depend upon the views expressed by the Senior Officers of these Bases as to what destroyers can be spared.

The report of the conference had been submitted to the various Local Senior Naval Officers, and two of them, viz. Admiral Sir Frederick Hamilton at Rosyth, and Admiral Stuart Nicholson at Grimsby, expressed a strong opinion that, sooner or later, the Germans would raid the convoy in strength. Several of these officers expressed doubts as to the wisdom of starting the Scandinavian convoy system, as they considered that it would not be possible to find a sufficient number of escorting vessels.

When the report reached the Admiralty, I gave

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orders that the system was to be instituted and reported on periodically.

The adoption of the Scandinavian convoy system had, eventually, a very striking influence upon the general naval strategy, according to "Naval Operations," Vol. V, pages 206–7. A few days after I left the Admiralty at the end of 1917, Sir David Beatty, then Commander-in-Chief of the Grand Fleet, attended a conference there on January 2, 1918, when the general situation in the North Sea was discussed, and Sir David Beatty informed the conference that it was, in his opinion, no longer desirable to provoke a fleet action even if the opportunity should occur.

At the request of the Admiralty the Commander-in-Chief wrote a letter on the subject which came before the War Cabinet. In this letter he pointed out that the enemy could, as an extreme case, attack the convoy with the whole High Sea Fleet, and it was obviously impossible to have the whole Grand Fleet continually protecting the convoy. He mentioned the dissipation of the strength of the Grand Fleet which the protection of the convoy involved, and put forward the general conclusion that, in his opinion, the correct strategy of the Grand Fleet was "no longer to endeavour to bring the enemy to action at any cost, but rather to contain him in his bases until the general situation becomes more favourable to us." This attitude was approved by the Government.

At the time that this change of policy took place the relative strength of the two Fleets was approximately as shown in the following Table:—

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| | *Grand Fleet* | *High Sea Fleet* |
|---|---|---|
| Dreadnought Battle-ships . | 34* | 19 |
| Pre-Dreadnought Battle-ships. | 0 | 7 |
| Battle-Cruisers . . . | 8 | 5 |
| Light Cruisers . . . | 27 | 20 |
| Destroyers . . . . | 109 | 88 attached but many more available |

* Including 4 U.S.A. Dreadnoughts.

Nothing could show more clearly the influence of the responsibility for convoy protection upon general Naval strategy.

### The United States Enter The War

The entry of the United States into the War on April 6, 1917, helped us in many directions as regards the introduction of a general convoy system.

(1) They were able to give us very considerable assistance in the matter of the provision of ships for ocean escort.

(2) We were able eventually to relieve the vessels of the 10th Cruiser Squadron from their blockade work and utilize them as ocean escort vessels.

(3) They supplied destroyers which we could use for escort through the submarine zone. Before this was done, however, Admiral Sims and Mr. Page, the U.S. Ambassador, found it necessary to send very strong representations to the U.S. authorities to convince them of the urgent necessity for this assistance. Six U.S. destroyers arrived at Queenstown on May 4, six on May 17, and six on May 24.

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(4) We were able to place in the United States our staff required for organizing and assembling convoys.

(5) We could use United States ports at which to assemble the convoys.

(6) Finally, a most important result was the fact that convoys could, after leaving the ports of assembly in the United States, as an organized group, have a period of at least a week before entering the submarine zone, during which *intensive training in station-keeping could be given. This was invaluable.* Obviously the better the station-keeping of ships in a convoy, the smaller could be the destroyer escort in the submarine zone and the less the chance of successful submarine attack.

The thoughts of many people were turned in the direction of a convoy system in the early part of 1917. It was natural that, apart from experience of convoys in the old wars as the method of defence against attack by surface ships, a similar solution of the problem of trade defence in this form against attack by submerged submarines should be sought. So far as Naval officers were concerned, they had seen for themselves how successful had been the protection of the Fleet from submarine attack by the use of a destroyer screen, *and providing that merchant ships steaming in company could keep station and manœuvre with something approaching the same degree of efficiency as warships,* a similar destroyer screen would ensure the same degree of safety. As against this it was of course obvious that with a general system of convoy of merchant ships in operation convoys could not possibly be pro-

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vided with a destroyer escort in any way approaching in strength that given to the battle fleet, and it was not easy to decide what proportion the number of destroyers should bear to the number of ships in convoy to give reasonable security to them. The answer to this problem lay very largely in the ability of those in charge of merchant ships to keep accurate station and to manœuvre in company. With this point settled there still remained the question as to how the necessary escorting destroyers were to be provided.

In reply to my memorandum in November, 1916, to the officers of the Grand Fleet asking for suggestions to combat the submarine menace, several officers wrote of convoy in general terms as a possible antidote; but, quite naturally, they were not able to suggest whence the vessels necessary for the protection of the convoys were to be obtained. Similar ideas came to the Admiralty from other sources, where knowledge was incomplete; but, here again, no practical suggestion for the provision of the necessary escort vessels could be forthcoming. Those outside the Admiralty could not be expected to appreciate the many difficulties involved and the detailed and complex organization needed for the introduction of a general convoy system.

It should be mentioned that, whilst the general trend of civilian opinion favoured a convoy system, if and when practicable, a good many shipowners, who realized the difficulties attendant upon its introduction, and the possible dangers associated with it, to a greater extent than persons with less knowledge

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of the facts, looked upon it with very serious misgivings.

In this connexion it may be observed that Admiral Sims in his book, "The Victory at Sea," p. 114, mentions having met Mr. Lloyd George and other Cabinet Ministers at dinner on April 30, 1917, where "he found the Prime Minister especially favourable to a convoy system," and he adds, "in fact, civilians in general were more kindly disposed toward the convoy than seamen, *because they were less familiar with the nautical and shipping dangers which it involved.*" Also, on p. 113 of his book, he mentions that he himself was strongly in favour of the convoy system, but adds the following statement: "*There was, however, still one serious impediment to adopting this convoy system and that was that the number of destroyers available was insufficient.*" As I have mentioned, Admiral Sims sent urgent messages to Washington pressing for the dispatch of all available craft suited for escort work. Later, on the same page, he goes on to say, with reference to the provision of the United States destroyers, "*I do not see how otherwise it could have been established in any complete and systematic way at such an early date.*" He also records, on p. 95, the fact that the United States provided many of the ocean escort vessels.

It should be mentioned here that the French and United States Navy Departments were both opposed to the introduction of a convoy system.

In May, 1917, the United States Navy Department, whilst agreeing to the trial of an experimental convoy,

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stated that "it did not consider it advisable to attempt the character of convoy outlined. In large groups of ships under convoy, fog, gales, inexperience of personnel, and general tension on merchant vessels, make the hazards of the attempt great, and the probability of the scattering of the convoy very strong."

The Navy Department suggested instead that vessels should, as an experiment, be sent in groups of four of equal speed, each group being convoyed by two destroyers.

In the Admiralty itself there were—as elsewhere—divided opinions on the subject. Some officers favoured a convoy system, some were opposed to it. Good arguments could be produced on each side; but, as was only natural, the inherent difficulties of the adoption of the general convoy system were most apparent to officers whose positions enabled them to realize the shortage of destroyers, and the intricate organization needed to make the scheme safe and workable.

My own attitude in the early months of 1917 was that we could not possibly produce the necessary escort vessels; and, that until this difficulty was overcome we should have to postpone the introduction of a convoy system. I did, however, as stated on page 6, Vol. V, "Naval Operations," warn the staff at the Admiralty that convoy might have to be introduced in the Atlantic to protect trade against the raider *Moewe*, and said that the question must be borne in mind. Meanwhile, I endeavoured, in minutes written to the War Cabinet, and during attendance at War Cabinet meetings, to point out the strain upon the Navy resulting from the

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policy then being carried out, of engaging in large military operations overseas, involving the use of many merchant ships and escort vessels for their protection, since the command of the sea was, at least temporarily, largely in the hands of the enemy submarines.

There seemed to be a tendency to apply the term "command of the sea" to surface vessels only, and to ignore the fact that the command of the sea against submarines was even of greater importance, and certainly more difficult to obtain under the conditions then existing.

The question of convoy was discussed at several War Cabinet meetings in the early months of 1917, and the impossibility of starting the system at this time was frequently pointed out.

In February, 1917, a paper written by Sir Maurice Hankey, Secretary to the Cabinet, was (according to Vol. V, "Naval Operations") discussed at an informal meeting between Mr. Lloyd George, Sir Edward Carson (First Lord of the Admiralty), Admiral Duff and myself. I do not personally recollect this discussion, so that it could not have left much impression on my mind. Extracts from this paper are given in "Naval Operations." In it the objections to the patrol system are very well summarized; but, whilst this was an easy matter, the difficulty was to provide a substitute for it. The matter is put in a nutshell by Admiral Sims on p. 122 of his book. After mentioning the criticisms made of the patrol system of defence as compared with a convoy system, he says: "*This criticism is of course justified; still we must understand that it was the only possible*

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*method until we had enough anti-submarine craft to make the convoy practicable.*" Sir Maurice Hankey's paper advocated the introduction of a convoy system and pointed out its advantages very clearly, as might have been expected from its authorship, but it minimized the serious difficulties with which we were then faced such as:

(1) The impossibility of providing the necessary ocean escort vessels.

(2) Our inability to use American ports as ports of assembly and the consequent objections mentioned on page 102.

(3) The difficulty of providing fast escort vessels through the submarine zone. This is very lightly disposed of by proposing a reorganization of the existing distribution of anti-submarine craft.

This latter question was one to which I had devoted immense attention since my arrival at the Admiralty in December, 1916, with a view to providing escort vessels for merchant ships through the submarine zone. I therefore knew, only too well, the absolute impossibility at this date, viz. February, 1917, of finding from any source a sufficient number to start a convoy system. Indeed, I frequently had to inform senior officers of various districts that it was out of the question to accede to their urgent requests for more destroyers or other anti-submarine vessels, as they did not exist. A few figures on this subject from official sources may be of interest.

(1) Between January and April, 1917, apart from additions made by the Admiralty to various



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forces, urgent demands were received from different commands for a total of 30 more destroyers or "P" boats.

(2) In one month, September, 1917, the Devonport and Queenstown Commands made urgent representations as to the necessity for an addition of 23 destroyers to the two Commands for convoy duties.

(3) Between April and September there were frequent demands for more destroyers or "P" boats.

(4) In November, 1917, I informed the Cabinet that the demands from various Commands for destroyers at that time exceeded the supply by a total of 90.

The following figures show the position in regard to modern destroyers at different periods of the year 1917. It will be seen that the Harwich and Dover Forces were slightly weakened in the middle of the year at considerable risk, in order to provide destroyers for the convoy work which was mainly carried out by destroyers from Devonport, Queenstown and Buncrana.

| *Months* | *Grand Fleet including flotilla leaders* | *Harwich and Dover Forces* | *Devonport* | *Queenstown* | *Buncrana* |
|---|---|---|---|---|---|
| January . | 107 | 63 | 14 | 0 | 0 |
| June . | 105 | 52 | 38 | 32* | 0 |
| November . | 112 | 50 | 37 | 35* | 29 |

* The Queenstown force included 18 United States destroyers in June and 34 in November.

On a typical day late in June, 1917, when a partial convoy system had been inaugurated, the destroyer force was distributed as shown in the following Table:—

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| | *Modern Destroyers* | *Old Destroyers* | *Sloops* | *"P" Boats* |
|---|---|---|---|---|
| Grand Fleet | 80* | | | |
| Battle-Cruiser Force | 29* | | | |
| Dover Force | 33‡ | 10 | | 6 |
| Harwich Force | 26 | | | |
| Convoying between Beachy Head and Portland | 13 | 9 | | 10 |
| East Coast Convoy | | 23 | | |
| Trade protection, convoy at Devonport | 38 | | | |
| Trade protection, convoy at Queenstown | 32† | | 17 | |
| Trade protection, North of Ireland | 4 | 4 | 4 | |
| Local defence in vicinity of Portsmouth, Portland, Devonport and Pembroke | 2 | 12 | | |
| Sheerness Force, mouth of Thames | | | | 9 |
| Escort duty from Newhaven | | | | 5 |
| Local defence and patrol for vicinity of Scapa Flow, Cromarty, the Tyne, Lowestoft and Harwich | | 18 | | 6 |
| In the Mediterranean | 29 | | 8 | |

* Out of the 109 destroyers attached to the Grand Fleet and Battle-Cruiser Force, 12 were refitting, 4 on the Aberdeen patrol, 5 on Scandinavian convoy, and 30 others at sea on patrol, leaving 56 available.

† Including 28 U.S.A. destroyers.

‡ Out of the 33 Dover destroyers 13 were under repair.

Later on in these pages it will be seen that the shortage of sloops and destroyers existed up to well into the year 1918, in spite of the fact that a building programme was inaugurated which provided for the construction of an

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additional 110 destroyers by the end of 1918 as well as 60 trawlers of good speed for convoy work.

To quote Admiral Sims once again he remarks on p. 152 of his book as follows:—"In this connexion we must keep in mind that at no time until the Armistice was signed was any escort force strong enough to ensure entire safety.... The fact that all escort forces were very inadequate placed a very heavy responsibility upon the escort commanders and made them think twice before detaching a destroyer in order to protect stragglers."

A heavy drain upon our destroyer force during the war was of course caused by the necessity for protecting troop transports and ammunition ships during passage. The total troop movements that took place during the war is here given, so that this question may be understood. The number of effective troops moved *by sea* during the war was just on *twenty million*. In addition some three million non-effectives were moved *by sea*. About 70 per cent. of this movement took place across the English Channel, the remaining 30 per cent. being divided between:—

(*a*) The United Kingdom and the Mediterranean, India and the Persian Gulf.

(*b*) Between India, Egypt, and East Africa.

(*c*) Between Canada, the U.S.A. and the United Kingdom.

(*d*) Between Australia and New Zealand and Egypt and the United Kingdom.

(*e*) Between different ports in the Mediterranean.

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The total number of troops moved across the Channel was *fifteen and a half million;* and in the Mediterranean (the area in which it was particularly difficult to ensure safe passage) *two million.*

The cross-Channel movement of troops took place principally from Southampton, Portsmouth, Newhaven, Folkestone and Boulogne. In 1917 the daily average of ships requiring escort crossing from these ports was 17. This of course included the leave service.

As regards troop movements to places other than France, it was considered necessary at the beginning of 1917 to sail these transports in convoys of five or six vessels with a destroyer escort provided from Devonport through the submarine zone and an ocean escort subsequently.

It was very difficult to ensure safety for troop movement by sea in the Mediterranean. Although only one tenth of the total troop movement took place in these waters, *three fourths of the troopships sunk during the War were sunk in the Mediterranean.* It will be realized how great an anxiety and responsibility rested upon the Navy under these conditions. So far as was possible the policy in 1917 was to reduce the transport by sea in the Mediterranean and, where circumstances were favourable, to move troops by land.

I pointed out, on more than one occasion during 1917, the great difficulty in which the Navy was placed by the immense drain upon our destroyer force caused by the necessity of protecting troop transports, and vessels

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supplying the troops in overseas theatres of war with munitions and other essentials. The Salonica Force was a case in point, and in view of the strong opinion held at the War Office as to the doubtful value of the military operations in that theatre of war, I urged in April the withdrawal of at least some portion of it. My object of course was to free merchant ships for cargo carrying, and escorting vessels for work nearer home, particularly that of dealing with the submarine menace to our trade. The number of merchant ships allocated to the Salonica Force in the summer of 1917 totalled 70, plus 35 for use as fleet messengers, mine-sweepers, etc.

It was necessary to be very outspoken to the War Cabinet on the subject of the submarine danger even at the risk of being accused of pessimistic views, for it was very difficult during the first half of 1917 to get the magnitude of the danger realized. The facts of the situation had to be faced, and faced boldly, not ignored or minimized. There was a tendency in high quarters to ignore the danger, and to delay taking the action necessary to meet it. I recollect in May, 1917, an occasion when Sir William Robertson and I endeavoured to persuade the Food Controller to introduce rationing. He was inclined to agree, but resigned at the end of May, and rationing was not introduced until much later. Whilst pointing out the danger to the Cabinet, the Admiralty of course, so far as the public was concerned, took an optimistic view of the situation. My personal view of the danger was largely influenced by the feeling that if the German submarine officers were equal in

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efficiency to our own, we were in truth faced with grave difficulties. The extent of the danger depended on whether the Germans could keep up the skill of the submarine officers who were under training to man their new vessels, to the standard of those officers who met with such success in their work in the first years of the war, and also on the rate of completion of new submarines. Fortunately for us there was a distinct falling off in skill in the handling of German submarines during the two years 1917 and 1918.

Other possible dangers to a convoy system not mentioned in Sir Maurice Hankey's paper were:—

(4) Surface attack on a convoy and the heavy losses that would in that event be incurred.

(5) The similar heavy losses which a mine-field might inflict on a convoy.

Many advocates of a convoy system also entirely failed to realize the abstruse nature of the problems involved in its adoption. They seemed to think that such a system could be put into operation by the giving of a simple order, or by the mere stroke of a pen. It was, on the other hand, an operation involving most careful and complex organization, and necessitating great accuracy in its working in order to avoid disaster. In fact, the introduction of the general convoy system made it necessary for the Admiralty to take upon itself the control of the ships of the Mercantile Marine. The actual control of the convoys while at sea was carried out from the Admiralty during the greater part of their

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passage. The courses to be steered by convoys had frequently to be directed from the Admiralty, either to prevent two convoys getting within dangerous proximity to one another, or to take them clear of an area in which submarines had been located. Frequently it became necessary to alter the destination of a convoy as it approached home waters. The Admiralty was, indeed, often directing the movements of several merchant fleets at a time. We were, most fortunately, very often aware of the position of the German submarines, owing to our interception and decoding of their wireless messages, and were therefore able to direct a convoy to alter its course as necessary to avoid submarine attack.

### Partial Convoy

Prior to and during the early part of April, 1917, the policy of convoying *a portion* of the Atlantic trade was considered at the Admiralty, but the risk involved was too great. As stated on page 7, Vol. V, "Naval Operations," I was of opinion that a partial convoy system would be useless and dangerous.

The danger of introducing such a system was clearly shown in the summer of 1917 when homeward convoy only had been introduced, with the consequent serious loss of protection to the outward trade, owing to the withdrawal of vessels from patrol duty for convoy work, the result being a great increase in losses to that trade.

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## CHAPTER IX

### THE EFFECT OF THE INTRODUCTION OF UNRESTRICTED SUBMARINE WARFARE

WITH the introduction on February 1 of unrestricted submarine warfare the heavy and growing losses in world shipping during February (532,000 tons) and March, 1917 (599,000 tons), caused great anxiety, and Admiral Duff, and the Director of the Trade Division, were in constant conference with me on the subject. We frequently discussed the possibility of instituting a convoy system. We visualized the losses which might occur were an inadequately protected convoy successfully attacked, and the prospects that we had of providing sufficient protection to make the system reasonably safe.

The destroyer strength required for an Atlantic convoy system depended of course on the number of vessels entering into and sailing from British ports weekly.

Commander Henderson of the Anti-Submarine Division had examined this matter in consultation with the Ministry of Shipping, and ascertained the correct figures for overseas shipping. The great shortage of the necessary escorting craft was apparent, but conditions were gradually changing and by mid-April it seemed



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possible that some form of convoy was becoming a feasible proposition.

In the first half of April, 1917, there had been a reduction in the number of vessels sunk by submarine attack, but in the latter part of that month the figures ran up at such a rate that it became obvious that some change of system was essential if it could conceivably be introduced. The total loss of world shipping during that month was 869,000 tons.

The only possible change was a trial of a convoy system and certain facts had unquestionably by this time reduced the difficulties of making this trial, and the danger of real disaster which a premature use of the system would have certainly involved. These facts were:—

(1) The entry of the United States into the War with a consequent prospects of assistance in the matter of ocean escort vessels and destroyers and the use of U.S. ports.

(2) The completion of the formation of a Ministry of Shipping with control of, and responsibility for, the employment of British merchant shipping. (Direct control of shipping was an essential feature of a convoy system.)

(3) Some increase in the numbers of our own destroyers, sloops and "P" boats. The net increase (after allowing for losses) averaged about 5 T.B.D.'s, 3 sloops, and 4 "P" boats per month.

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There were at this time two directions in which the Admiralty had gained some experience of a form of convoy under Admiralty supervision, viz. the "controlled sailings" of the French coal trade, and the projected Scandinavian convoy system.

The controlled sailings had been in operation for some six weeks and had been remarkably successful in reducing losses in the French coal trade. It should, however, be clearly understood that the controlled sailings of this trade were an entirely different proposition from the working of an Atlantic convoy. It was quite incorrect to assume, as did some people, that the difficulty of providing adequate escort for Atlantic convoy had been overrated at the Admiralty because three or four trawlers gave protection to some 20 vessels in the coal trade. The two problems were in no way similar. The safety of the coal trade was obtained largely because we could keep the narrow seas through which the trade passed swept fairly clear of submarines. We also had several alternative routes, the safest of which could be adopted at the last moment, or the sailing even be postponed, should necessity arise. Neither of these measures could be applied in the case of Atlantic convoy.

Our experience in working out the details of the Scandinavian convoy had also been of value; and although the danger of attack by surface vessels was obviously greater, in that case it was a far simpler proposition than that of an Atlantic convoy by reason of the shortness of the route, much of which could be traversed at night.

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## The Adoption of Atlantic Convoy

On April 26, 1917, Admiral Duff, the Director of the Anti-Submarine Division, as the result of the foregoing considerations, put forward a minute to me in which he stated that he considered the time had arrived when we must be ready to introduce a comprehensive scheme of convoy at any moment. He pointed out the features I have mentioned, and suggested in an important paper proposals for dealing with the incoming trade from the North and South Atlantic. The following are extracts from this paper:—

The following outline proposals for the convoy of all vessels—British, Allied and Neutral—bound from North and South Atlantic to United Kingdom are submitted. The term "all" does not include the fast vessels, say 15 knots and above.

Whether the general system of convoy is adopted or not, a carefully worked out plan, in conjunction with the Shipping Controller, should be completed, so that the completed organization will permit of effect being given to it in the minimum space of time.

The problem is very largely that of the Shipping Controller, and made workable, it will, at any rate for some period, give the enemy submarines considerably greater difficulty in finding their prey. Furthermore, it would appear that the larger the convoy passing through any given danger zone, provided it is moderately protected, the less the loss to the Merchant Service; that is, for instance, were it feasible to escort the entire volume of trade which normally enters the United Kingdom *per diem* in one large group, the submarine as now working would be limited to one attack, which, with a

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Destroyer escort, would result in negligible losses compared with those now being experienced.

The general proposal would be to convoy vessels by Man-of-War or Merchant "Q" ships from certain Convoy Depots, and bring them to a longitude clear of the danger zone; there to be met by an escort of Destroyers and convoyed into a port of refuge; from these ports taken by other escorts to their port of destination.

The Convoy Depots indicated are:—

Dakar.
Gibraltar.
Newport News.
Louisberg (Canada).

The volume of trade in the North and South Atlantic this day is as follows:—

| | *To U.K., British and Allied* | *To U.K. Neutral* | *To Scandinavian Ports (Neutral)* |
|---|---|---|---|
| Halifax, St. Lawrence, Boston | 21 | 27 | 72 |
| New York | 48 | .. | .. |
| Gulf (Newport News) | 67 | 7 | 29 |
| South-East Coast of America | 34 | 21 | 26 |
| Cape, i.e. Dakar | 74 | 18 | 6 |
| Gibraltar | 64 | 14 | 13 |
| TOTAL | 308 | 87 | 146 |

Grand Total: to U. K. . . 395
To Scandinavia . . . 146 (can be neglected)

Assuming the average voyage from the various depots to be 15 days, an average of 26 vessels would be required to be

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convoyed through the danger zone *per diem*, this group may not prove to be the maximum which could be dealt with by the Mercantile Marine, observing that prior to arriving in the danger zone at least 10 days will be spent at sea, where one hour *per diem* can be spent in teaching station-keeping—zig-zagging. (N.B.)—The main essential from the practical point of view, and which does not at present exist, is a portable telephone or some similar form of communication from fore bridge to engine-room.

Delays due to collecting convoys must occur, but such delays can be made good in transit, since it will not be necessary to deviate the shipping on the ocean to such a great extent as at present to avoid raiders. The existing delays caused by certain vessels having to be armed will also not occur.

It is proposed that convoys should leave their depots as follows:—

Convoy leaving every four days from Gibraltar, approximately 18 vessels.

Convoy every five days leaving Dakar, approximately 18 vessels.

Convoy every four days leaving Louisberg, 16 to 20 vessels.

Convoy every three days leaving Newport News, 18 vessels.

Convoy to be arranged so that the arrivals from these various ports do not synchronize on the same day.

The following forces will be required to convoy these vessels through the submarine danger zone as it at present exists, viz. about 20° W.:—

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| | |
|---|---|
| Gibraltar, four vessels—two outgoing, two homeward bound—two spare . . | Total 6 |
| Dakar, three outgoing, three homeward bound, three spare . . . . . | Total 9 |
| Louisberg, four outgoing, four homeward bound, four spare. . . . . | Total 12 |
| Newport News, six outgoing, six homeward bound, six spare . . . . . | Total 18 |
| | Grand Total 45 |

At the present moment it is not proposed to convoy vessels from the River Plate to Dakar, nor from the Cape to Dakar, but, if considered necessary, 12 additional Cruisers or armed Merchant Vessels will be required for this.

It is proposed that on arrival of each convoy at the danger zone it should there be met by six Destroyers, who would escort it to a port of refuge, of which St. Mary's, Scillies, Plymouth, Milford Haven, and Brest are suggested, and in order to do this 45 Destroyers are necessary.

Vessels on arriving at the refuge ports to be convoyed by armed yachts, P.Q. vessels, trawlers, etc., to their ports of destination.

Generally speaking, it is thought feasible that those vessels outward and homeward bound to River Tyne and Liverpool can enter by the north of Ireland route with a separate convoy.

The actual statistics of vessels bound to these particular ports from the North American coasts are not available, but are being obtained. As regards the outgoing convoys, the outgoing vessels should assemble at the ports indicated for the incoming vessels, and be taken out clear of the existing

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submarine danger zone, and convoyed to their ports of destination.

It is proposed that the American Fleet might well take care of the New York and Canada traffic, the United States Destroyers escorting through the danger zone, the remainder, so far as oversea escort is concerned, being provided by British and French Men-of-War and armed Merchant Vessels.

The scheme above is only generally outlined, and if approved in principle, it is proposed, in conjunction with a representative of the Trade Division and Shipping Controller, to work out the details necessary to give effect to this proposal, with a view to its ultimate introduction as a whole. For the moment, vessels of 15 knots and over, which are exceedingly few, should be eliminated from the scheme.

It will be noted that it was pointed out that *prior to arriving in the danger zone there would be some ten days at sea during which the vessels in the convoy could be trained in station-keeping and zig-zagging in company.* This was a most important feature.

I approved the proposal on the following day, April 27, and arrangements were at once made on that date for a trial convoy being sent home from Gibraltar. The decision to start a convoy system in the Atlantic involved heavy responsibility owing to the grave losses which might be incurred both in ships and personnel should a convoy with an insufficient number of escorting vessels be successfully attacked; but I felt that under the altered conditions, viz. the hope of support in various directions from the United States and the very serious losses which were taking place under the then existing

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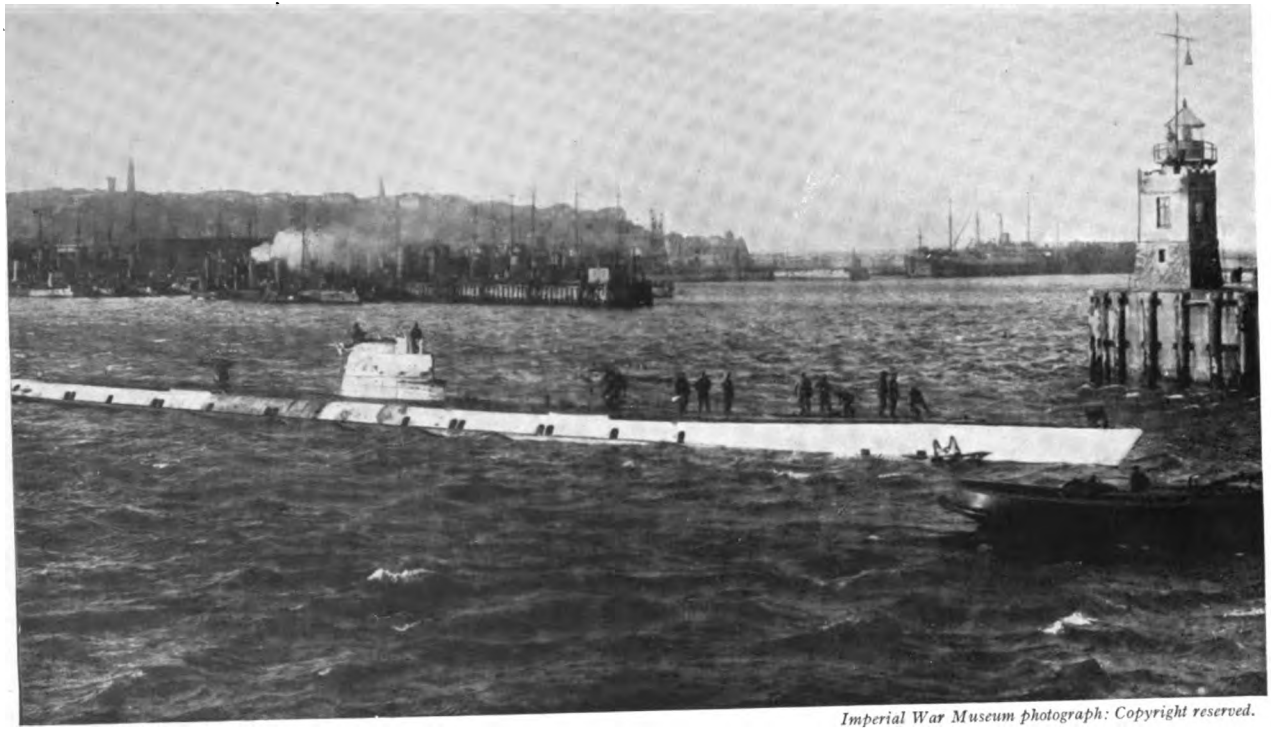

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GERMAN SUBMARINE-CRUISER ENTERING HELIGOLAND HARBOUR, OCTOBER, 1918.

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system, it was justifiable to take the risk of starting a system of convoy provided that it was done under thorough and most careful organization.

After collecting the ships and issuing the necessary instructions the trial convoy left Gibraltar on May 10, and arrived safely at Plymouth on May 20. In the report of the Officer-in-Charge of the escorting destroyers he stated that they had experienced difficulty in finding the convoy before it entered the submarine zone, the convoy's position being somewhat inaccurate owing to no sights having been obtained for three days. He also reported that he thought 6 destroyers was a sufficient escort for 15 ships and mentioned that the speed of the convoy was 6½ knots.

Prior to the start of the Gibraltar convoy, viz. on May 1, Admiral Sims, after consultation with me, cabled to the Naval Department at Washington to say that the Admiralty had decided to adopt a system of convoy for North and South Atlantic trade, both for protection against surface raiders during the ocean voyage, and against submarines during the passage through the submarine danger zone. He asked whether the United States would provide the necessary ocean escort of about 14 vessels for the convoys from New York and Hampton Roads.

The Navy Department agreed to starting the first experimental convoy, but expressed the opinion that it was not advisable to adopt a general system.

A copy of Admiral Sims's message was sent to our Naval Attaché at Washington.



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On May 4, instructions for forming a trial convoy from Hampton Roads were issued. Twelve ships of the convoy left on May 24, and reached the English Channel safely on June 7. Subsequently a regular system of convoys left every four days from Hampton Roads.

On April 25, a discussion had taken place at the War Cabinet regarding the situation in regard to losses in merchant ships, control of shipping, imports of food, ammunition, etc., for our Allies and ourselves. It had been arranged that the Prime Minister should visit the Admiralty with a view to investigating the means in use in regard to anti-submarine warfare. Other members of the Cabinet were directed to investigate the remaining questions.

There appeared to be a feeling that the Cabinet was not sufficiently informed on varying aspects of anti-submarine warfare, protection and control of shipping, priority of various claims on shipping, our own and our Allies' requirements of food and ammunition, shipbuilding, steel, etc., and that there was insufficient co-ordination in these matters. The Prime Minister's visit to the Admiralty took place on April 30. He was given full information regarding anti-submarine warfare. Amongst other things, he was informed that it had been decided to make an immediate trial of a convoy system.

It has frequently been erroneously stated that the Admiralty decision in this matter was the result of pressure brought to bear on the Admiralty from the War

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Cabinet and civilian quarters. Possibly this idea has arisen from the proceedings at the War Cabinet on April 25, previously mentioned, but it is quite incorrect. The views of experienced Naval officers on a technical question involving the gravest responsibility could not possibly be affected by outside opinion, however high the quarter from which that opinion emanated. The reasons for the Admiralty decision were those already mentioned, the principal ones being:—

(1) The great increase in losses of merchant ships due to the introduction of unrestricted submarine warfare by the Germans. This heavy rate of loss justified risk being taken in instituting a convoy system even with somewhat inadequate escort forces.

(2) That the entry of the United States into the war, which coincided with this increase of loss, had immensely lessened the disadvantages and difficulties attendant on the convoy system *and had made its adoption possible.*

(3) *Control of merchant shipping was now a feasible proposition.*

(4) That the last few months had seen some increase in our own destroyer and sloop forces required for escort duty.

On May 17, a committee of four Naval officers, with a representative from the Ministry of Shipping, was appointed by the Admiralty to draw up a complete organization for a general system of convoy.

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They were directed to deal with the following questions:—

(*a*) Ports of assembly abroad and in the United Kingdom with due regard to trade requirements, including the protection of vessels to the assembly ports in the United Kingdom.
(*b*) The framing of a programme for dates of arrival and departure of convoys.
(*c*) The organization of requirements for merchant ships, both as regards material and personnel, for the efficient conduct of convoy.
(*d*) Alternative fixed rendezvous of convoys with due regard to final ports of destination.
(*e*) Arranging call signs, wireless instructions and preparing a simple signal pamphlet to aid the convoys.
(*f*) Instructions as an aid to Masters as to station-keeping, etc.
(*g*) General route orders, bearing in mind that American and Gibraltar convoys would probably be alternative East and West coast.
(*h*) Ports of rendezvous for distribution of subsidiary escort of patrols to the discharging ports.
(*i*) Organization and basing of escorts.
(*j*) Coastal traffic convoys and protection.

The Committee reported very fully on June 6, and its report was followed in its main details as the basis of the system of conducting Atlantic ocean convoys. The report after being concurred in by Admiral Duff, the

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Assistant Chief of the Naval Staff, came before me on June 11, and I minuted it as follows:—"Propose to approve generally the recommendations of the Committee which are sound and well thought out. Propose to put them into force as the situation develops and the necessary vessels for escort and convoy duty become available." The First Lord approved on June 15.

In the report the following recommendations (amongst many others) were made:—

(1) *General Principle on which proposals are based.*

(*a*) *Outward*-bound convoys should, when practicable, be assembled in close proximity to their port of loading and proceed under destroyer escort direct out of the submarine danger zone.

(*b*) *Homeward*-bound convoys should, as far as practicable, be brought direct to their ports of discharge.

In both cases therefore arrangements should be made as far as practicable for vessels to be grouped according to their final port of destination.

(2) *Focal points for trade in the United Kingdom.*

(*a*) North coast (Tyne to Humber).

(*b*) London and the Thames and British and French ports in the Channel.

(*c*) Bristol Channel ports.

(*d*) Liverpool (Liverpool, Birkenhead & Manchester) and Clyde. For convenience (*a*) and (*b*) to be combined under the

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designation "East coast" and to route North-East coast ships via the Channel.

(3) *Focal Points for Homeward-bound Trade.*

(*a*) From Northern U.S. Atlantic ports and Canadian Atlantic ports.

To be called the New York Convoy.

(*b*) From Southern U.S. Atlantic ports, West Indian ports, Gulf of Mexico, Central America, Venezuela, Guiana and Panama Canal.

To be called the Hampton Roads Convoy.

(*c*) From South America, except ports included under (*b*), South Africa (to include all vessels coming home via the Cape) and West Africa.

To be called the Dakar Convoy.

(*d*) From the Mediterranean (to include Morocco) and the Spanish southern ports, west of Gibraltar.

To be called the Gibraltar Convoy.

(4) *Vessels for inclusion in Convoy.*

Vessels whose *actual sea speed* is less than 12 knots, or more than 8½ knots, only should be included, except in the Gibraltar convoys which should include vessels with a sea speed as low as 7 knots.

(5) Convoys to be arranged in cycles of 8 days.

(6) *Outward Convoys.*

1st and 5th days, Bristol Channel to North and South Atlantic.

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2nd and 6th days, Liverpool (including Clyde) to North Atlantic.

3rd and 7th days, East Coast to North and South Atlantic.

4th and 8th days, combined (East and West Coasts Convoy to Gibraltar.

(7) *Homeward Convoys.*

Dates of departure to be arranged so that one arrives at rendezvous each day.

Every 8 days at 4 day intervals:—
New York (and Canada) to West Coast of Gt. Britain.
New York (and Canada) to East Coast of Gt. Britain.

Every 8 days at 4 day intervals:—
Hampton Roads to West Coast of Gt. Britain.
Hampton Roads to East Coast of Gt. Britain.

Every 8 days at 4 day intervals:—
Gibraltar to West Coast of Gt. Britain.
Gibraltar to East Coast of Gt. Britain.

Every 4 days, Dakar to Gt. Britain.

Vessels for northern French ports to be included in East Coast convoys.

(8) *Destroyer Escorts.*

(*a*) For outward convoys and convoys leaving Gibraltar. To escort convoys from port of assembly to a position outside submarine danger zone.

(*b*) For homeward convoys and convoys arriving at Gibraltar. To meet convoys at rendezvous and bring them to port of dispersion.

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In Appendix I of the Convoy Committee report the Organization and Basing of Destroyer Escorts was dealt with.

It was estimated that 14 "Escort flotillas" of 6 vessels each would be required for the complete Atlantic Trade Convoy system in the winter months, based 3 on Lough Swilly, 3 on Queenstown, 3 on Portland, 3 on Plymouth, 2 on Gibraltar.

It was considered that in some cases during the summer the outward escort flotilla could bring in a homeward convoy. As the number of escorts available was quite insufficient the detailed proposals in Appendix I were never attained. It was found necessary alike in winter and summer for the outgoing destroyer escort to accompany both an outward and a homeward convoy on each trip. As a general rule the escort took out a convoy, left it at night on the second day out, and met a homeward-bound convoy at daylight on the following morning.

Very careful organization and accuracy of movement were essential if the same escort was to screen both an outward and homeward convoy. It was necessary of course that the homeward convoy should be up to time at the rendezvous, otherwise the escort might, by being kept waiting, run short of fuel. The danger of a homeward convoy being delayed by bad weather, after the outward convoy had started, was of course far greater during the winter months than at other times of the year.

But in spite of many difficulties the arrangement was successfully carried out.

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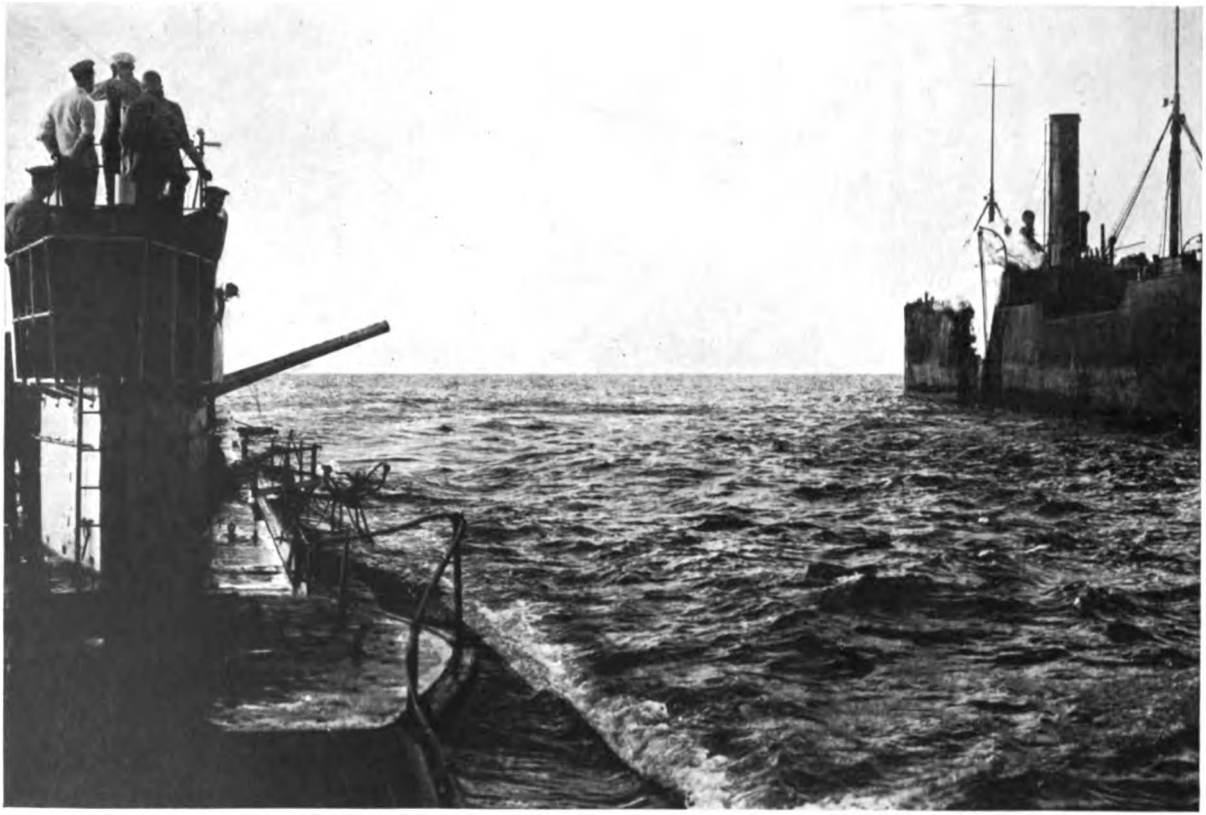

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U-35 SINKING A MERCHANT SHIP BY GUN-FIRE.

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In the case of escorts composed of destroyers or sloops, an endeavour was made later to ensure that each flotilla should consist of 11 vessels, of which 8 were always to be available for service. As there were not sufficient destroyers or similar craft available for all convoys, escorts composed of two destroyers, each with 10 trawlers, were detailed for convoys arriving from, and sailing for Gibraltar, and as there were three outward convoys to Gibraltar every eight days and only two homeward ones, the third outward escort was eventually used to meet the homeward Dakar convoy.

(9) *Ocean Escorts* to accompany each convoy.

*For outward Convoys to the North and South Atlantic.*

(*a*) A cruiser or armed escort vessel to join the convoy at the port of assembly and to take over the duty as escort vessel on the departure of the destroyer escort.

(*b*) *For Gibraltar convoys.* Special service vessels ("Q" ships) to act as escort assisted by destroyers in the home and Gibraltar submarine zones.

(*c*) *For Dakar Homeward Convoys.* Some Elder Dempster ships trading to the West coast to be heavily armed and to act as armed escort ships.

(*d*) *For Homeward Convoys from New York or Hampton Roads.* A cruiser or armed escort ship to join the convoy at port of assembly.

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(10) *Coastal Escorts.* Coastal escorts to be provided between ports of loading and assembly and ports of dispersion and discharge, except between the Downs and the northern entrance to the War Channel.

(11) *Port Convoy Officers.* Special officers to be appointed to ports of assembly at home and abroad as Port Convoy officers, with the necessary staff.

(12) *Commodores of Convoys* to be appointed to take charge of each convoy.

(13) *Size of Convoy.* It was estimated that the usual number of vessels in each convoy would be about 20, including neutral ships.

(14) *Special Requirements for Merchant Ships.* It was pointed out that these included:

(*a*) *Special Personnel.* 3 naval signalmen for the staff of the Commodore of Convoy; 1 naval signalman to each ship in convoy; 3 naval wireless ratings for the staff of the Commodore of Convoy; 3 men or boys to be specially supplied to each merchant ship for work in engine-rooms counting revolutions for station-keeping.

(*b*) *Material.* A fog buoy or hydroplane for each ship. Voice pipes or other means of communication between bridge and engine-room, shades for stern lights (oil-burning),

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oil-burning bow lights, station-keepers, revolution indicators, and other small details.

(*c*) *Special Instructions.* Special convoy Instructions, special convoy Signalling Instructions, etc.

(*d*) *Instructions to Masters.* Very full instructions were issued relating to order of sailing, station-keeping, procedure for assembly, the dimming and extinguishing of bow and stern lights and steaming lights, signalling, alterations of course, zig-zagging, procedure on sighting a submarine, use of smoke-producing apparatus, destruction of rubbish (i.e. not throwing it overboard), orders in case of separation, action to be taken during a fog, and other details.

It was pointed out in the report that it would take some time to put into working order a complete system of convoy for Atlantic trade and it was suggested that it should be introduced in stages as follows:—

(1) Commence with Gibraltar convoys, homeward and outward (9 ocean escorts required).

(2) If ocean escorts and destroyers were available, the Hampton Roads homeward convoy to be started simultaneously; if not, to establish it as soon as vessels became available.

(3) Homeward convoys from New York. As ocean escorts became available.

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(4) Homeward convoys from Dakar as ocean escorts became available.

(5) Outward convoys to North and South Atlantic as destroyer escorts became available.

The estimated volume of Atlantic trade to be included in the above proposals (British, Allied and Neutral vessels) was:—

*Homeward Convoys.*

| | |
|---|---|
| From New York every 4 days . . . | 24 ships |
| From Hampton Roads every 4 days . . | 18 ships |
| From Dakar every 4 days . . . . | 16 ships |
| From Gibraltar every 4 days . . . | 20 ships |

*Outward Convoys.*

| | |
|---|---|
| Liverpool to North Atlantic every 4 days . | 16 ships |
| Bristol Channel to North and South Atlantic every 4 days . . . . . | 20 ships |
| East Coast to North and South Atlantic every 4 days . . . . . | 16 ships |
| Combined (East and West Coasts) to Gibraltar every 4 days . . . . . | 26 ships |

On June 25, copies of the report were issued by the Admiralty and instructions issued that the recommendations were approved and that they would be put into force as the necessary vessels for escort and convoy duty became available.

A synopsis of the dates on which some of the different stages of convoy were approved in 1917 is given on the next page.

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1. *Hampton Roads Convoy,* interval of 8 days . . . . . May 24
2. *Hampton Roads Convoy,* interval of 4 days . . . . . June 15
3. *Sydney* (*Cape Breton*) *Convoy,* interval of 8 days . . . . . June 22
4. *New York Convoy,* for East Coast Great Britain, interval of 8 days. July 6
   *New York Convoy,* for West Coast Great Britain, interval of 8 days. July 6
5. *Gibraltar Convoy,* interval of 4 days . July 20
6. *Sierra Leone Convoy,* fast vessels . July 31
7. *Dakar Convoy,* slow vessels . . July 31
8. *Outward Atlantic Convoys* . . August 15
9. *Fast Outward Combined Troop and Mercantile Convoys,* from Halifax. August 23
10. *Through Mediterranean Convoys* . September

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# CHAPTER X

## CONVOY ORGANIZATION

THE details of the organization are given in this chapter.

*Formation of the Convoy Section in June,* 1917. Atlantic Trade Convoy arrangements were placed under the control of the Assistant Chief of the Naval Staff at the Admiralty, who was also a member of the Board. Subject to him were:—

(*a*) The "Organizing Manager of Convoys," who was Paymaster-Captain Eldon Manisty, R.N., appointed June 25, 1917. He controlled all sailings of convoys, and arranged programmes of their assembly, sailing, and dispersion. He also detailed escorts and Commodores, and acted generally as the Executive Authority of the system. The successful working of the system was to a very large extent due to his clever brain and his great organizing ability. He started the organization, arranged the creation and work of the staff, co-operation with the Ministry of Shipping and organization at the ports at home and abroad. No words of mine can adequately eulogize the exceeding value of the work which he initiated and carried out.

(*b*) The officer in charge of the Chart Room, who was responsible for the routeing of convoys, the



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charting of their position, and for taking action to divert convoys on receipt of any urgent information regarding the movements of the enemy.

With regard to (*a*), a Convoy Section was formed under the Organizing Manager of Convoys. The staff of this section had to be obtained gradually, and, so far as possible, without drawing upon the Active Service. The section was divided into sub-sections as follows:—

(1) North Atlantic.
(2) South Atlantic.
(3) Mediterranean.
(4) Scandinavian.
(5) and (6) Convoy attacks, reports, interview with officers concerned with convoys, framing and editing General Instructions, preparation of attack-diagrams, preparation and editing of Mercantile Convoy Instructions.
(7) Defects and repairs of vessels, and "Engineer-Captain's" work in connexion with Cruisers and Armed Merchant Cruisers employed on Convoy Service.

The Organizing Manager of Convoys kept in closest touch with the Chart Room and with the Ministry of Shipping; and, at the same time, co-ordinated the various sub-sections of the Convoy Section.

*Director of Mercantile Movements.*—At the end of September, 1917, three months after the formation of the Convoy Section, the Mercantile Movements Division

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was formed. It absorbed some of the sections of the Trade Division of the Naval Staff and also took in the Convoy Section, which, up till then had been directly under the Assistant Chief of Naval Staff. The Director of Mercantile Movements was appointed under the Assistant Chief of Naval Staff. The Organizing Manager of Convoys then came under the Director of Mercantile Movements.

*Liaison Officers.*—The French liaison officer was accommodated in the Chart Room, and the United States liaison officer visited the Convoy Section daily. Through these two officers the closest co-operation with the French and United States Navies was maintained, so that their convoy forces became part of the whole convoy organization. Communication with French or United States Naval authorities at Paris, Brest, or Washington was effected through these liaison officers.

*Marine Superintendent of Convoy Section.*—A selected Master Mariner was appointed to the Convoy Section with the title of "Marine Superintendent." His services proved invaluable, not only as a liaison officer with the masters of the Merchant Service, but also because his knowledge and experience were available in drawing up instructions for convoys and in dealing with the many points which were continually arising.

*Convoys and Ministry of Shipping.* The introduction of the convoy system synchronized with the establishment of the Ministry of Shipping and with the consequent *central control* of merchant ships.

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LORD MACLAY: SHIPPING CONTROLLER.

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The history of the formation of the Ministry of Shipping is as follows:—

Sir Joseph Maclay (now Lord Maclay) had been appointed Shipping Controller on December 9, 1916, but he possessed no administrative staff until mid-January, 1917. Towards the end of that month Sir Joseph formulated his views as to the responsibilities and scope of the work of a Ministry of Shipping. They included the direction of mercantile ship-building, the allocation of tonnage for the various purposes, the control of port facilities, and some hand in the employment of merchant ships in Government Service.

In February the Transport Department of the Admiralty was absorbed into the Ministry of Shipping, although the Director of Transports remained responsible to the Admiralty in regard to work affecting purely Naval matters.

By April, 1917, the organization of the Ministry of Shipping was practically complete. Mr. (now Sir) Norman Leslie was appointed head of the Convoy Section in the Ministry.

The Ministry of Shipping controlled employment, cargo, bunkering and destination. The Admiralty, as the convoy system was developed, controlled movements. The organization of merchant shipping was carried out in the Ministry of Shipping by a special Convoy Branch, and the member of the Ministry of Shipping placed in charge of this branch acted as liaison officer with the Convoy Section at the Admiralty. He had been a member of the Convoy Committee and had provided



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that committee with the necessary shipping figures to enable an estimate to be obtained of the amount of traffic on each route that would be required to be convoyed.

Early in 1917 a "card index" had been established at the Ministry of Shipping, supplied with special confidential information from ports at home and abroad, in order to keep accurate record of the movements, etc., of all merchant shipping, acting in fact as "Lloyd's" did in peace. By means of this card index, the Convoy Branch of the Ministry of Shipping was able to provide accurate information regarding the incidence of trade at any particular time, so that trustworthy estimates could be obtained when any change in the convoy system was needed or contemplated either for naval or mercantile reasons.

*Policy and Control centralized in London.* The centralization of control in London whereby this close liaison between the Ministry of Shipping and the Admiralty could be effected, enabled the movement of the shipping and the loading, bunkering, and discharge of ships to be co-ordinated. For example, as in most cases coal had to be exported in tonnage from this country, and as the more coal carried on a homeward voyage the less space was there available for cargo, the question of bunkering was a most important factor and required the closest supervision, which could only be carried out from London.

It was only in London that there existed the knowledge and latest information regarding the state of the

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ports, the cargoes required, the latest policy as regards neutrals, and even the movements of the enemy. The representatives (of the Ministry of Shipping, and the Admiralty) responsible for the working of the convoy system, could, in a brief discussion on the telephone, decide exactly what was to be done in any particular contingency; for they had between them all the information required to enable them to give an immediate decision. From London all strings could be pulled. In London, therefore, policy and control were centralized.

*Appointment of Port Convoy Officers.* The central authority having been established, the next step was to appoint officers, designated port convoy officers (P.C.O.s), at ports of assembly at home and abroad. Commencing abroad with Hampton Roads, as the system was extended, port convoy officers were appointed to Sydney (Cape Breton), New York, Halifax, and later in 1918 to Quebec, to Gibraltar, Dakar, Sierra Leone, and early in 1918 to Rio de Janeiro. At home, P.C.O.s were appointed to Lamlash, Devonport, Falmouth, Milford, and later to Liverpool and London.

*Initial Procedure at Commercial Ports.* The organization existing in 1917 at commercial ports at home and abroad, by which shipping intelligence officers, consuls, or naval vice-consuls issued route instruction to merchant shipping, rendered it comparatively easy to issue directions to shipping to assemble at certain ports for convoy. Ships affected were at first merely told to go to a certain port "for orders," so that the institution of convoys could be kept secret as long as possible.

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The main governing factor of the whole Atlantic convoy system, apart from the control of merchant ships, lay in the provision of destroyer escorts. The system could only be developed and extended as more became available for escort. The Convoy Committee recommended "convoys to be arranged in cycles of eight days." The main reason for eight days was that this was considered to be the minimum interval possible between the dates of arrival of convoys which had to be met by the same destroyer escort. For example, the Hampton Road East Coast Convoys at first arrived every eight days and were met every eight days by the Devonport flotilla detailed for this purpose; similarly the Hampton Roads West Coast Convoy, coming "north-about," were met every eight days by the Buncrana flotilla. The standard escort recommended by the Convoy Committee, based on an average of 20 ships in a convoy, was six vessels, but in order to be on the safe side for the first homeward North Atlantic convoys it was fixed at eight vessels. Later, as experience was gained, the strength was fixed as follows:—

| | |
|---|---|
| For 22 ships in the convoy . . | 8 destroyers |
| Between 16 and 22 ships . . | 7 destroyers |
| Under 16 ships . . . . | 6 destroyers |

But in the case of troop convoys the number was increased considerably for the purpose of life-saving in the event of a troopship being torpedoed. The Convoy Committee recommended that, if sufficient forces were available, separate destroyer escorts for outward and

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homeward convoys should be provided. If this could have been done the arrangements would have been much simplified and the work of the destroyer escorts much lightened, but sufficient forces were never available and consequently, when outward convoys were instituted, each destroyer escort had to take out a convoy as well as bring one in every eight days. The strain on the officers and men of the destroyers was heavy owing to the very short periods spent in harbour. In winter the vessels themselves suffered severely.

The arrangement by which the same destroyer escort had to screen an outward convoy, before meeting and screening a homeward-bound convoy, necessitated the most careful arrangement of dates of departure of convoys, particularly when fog or bad weather was prevalent.

The general system for destroyer escorts developed and its operation at the date of the Armistice in November, 1918, is of interest. It was as follows:—

(*a*) *Queenstown* provided a destroyer escort (of United States destroyers) every eight days to meet H.H. (Hampton Roads) East Coast Convoys and H.S. (Sydney C.B.) East Coast Convoys alternately. This escort took the convoy to about 5° W., where it was relieved by a destroyer escort from Devonport. The Queenstown escort, or part of it, then took any ships for French Bay of Biscay ports to Brest, and then returned to Queenstown.

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*Queenstown* was also required to provide a destroyer escort (United States destroyers) every eight days to meet alternately an H.C. Convoy (medium-speed troop convoy from Canada) for the West Coast and an H.E. "Homeward Eastern," i.e. "Through Mediterranean" convoy from the Mediterranean. It was therefore necessary so to arrange arrivals that the H.C. West Coast convoys and the H.E. convoys arrived at an interval of 16 days. Their destroyer escorts were required to bring the convoys as far as Liverpool, and then to take out O.L. Convoys from Liverpool south-about. Every 16 days an O.E. Convoy (Outward Through Mediterranean) was sailed from Liverpool with the O.L. Convoy, the escorts being combined for as far as the convoys were together.

(*b*) *Devonport* provided a relief escort for H.H. and H.S. East Coast Convoys, as above. Devonport also provided a destroyer escort every eight days to meet the H.N. (New York) East Coast Convoys which arrived every eight days; the destroyer escort which met this convoy was required on its way out to the destroyer rendezvous to escort an Outward (O.D.) Convoy.

*Devonport* was also required to meet every 16 days an H.C. (medium-speed) Convoy for the East Coast and to escort this convoy as far as Folkestone Gate and then to take out from Folkestone Gate an O.C. Convoy. Owing to the fact that this escort had to proceed right up the English Channel from the destroyer rendezvous,

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T.-B. Destroyers and other Craft going to the Rescue of a Torpedoed Ship.

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it could only carry out this service at intervals of 16 days.

*Devonport* was further required to meet every eight days H.L. (Sierra Leone) Convoys. The destroyer escort which met these convoys was required on its way out to escort an O.D. Convoy. In order to distribute the outward convoys from Devonport evenly, it was therefore necessary for the H.L. Convoys and the H.N. Convoys to arrive at intervals of approximately four days.

It will thus be seen that Devonport was required to provide four separate groups of escorts.

(*c*) *Buncrana* was required to provide an escort every eight days to meet H.H. (Hampton Roads) and H.S. (Sydney, C.B.) West Coast Convoys, which arrived alternately. The destroyer escort on its way out to meet these convoys was required to escort an O.B. Convoy which assembled at Lamlash. Buncrana was also required to provide an escort every eight days to meet H.X. Convoys (fast troop convoys from New York). After bringing in the H.X. Convoy to Liverpool, the destroyer escort refilled there and sailed the following day with an O.L.X. Convoy composed of ships from previous H.X. Convoys. The O.L.X. Convoys sailed north-about and the destroyer escort, after parting company with them, returned to Buncrana to prepare for meeting the next H.X. Convoy.

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(*d*) *Falmouth* was required to provide an escort consisting of two destroyers or two sloops and about 10 trawlers every eight days to meet an H.G. (Gibraltar) West Coast Convoy, and on its way out the escort was required to escort an O.F. Convoy (bound for Gibraltar).

(*e*) *Milford* was required to provide every eight days an escort similar to Falmouth to meet an H.G. (Gibraltar) West Coast Convoy, and on its way out the escort was required to escort an O.M. Convoy (bound for Gibraltar). *Milford* was also required to meet every four days an H.D. (Dakar) Convoy with a similar trawler escort, and on its way out the escort was required to escort an intermediate O.M. Convoy (bound for Gibraltar). In order that the O.M. Convoys should sail at even intervals it was therefore necessary to arrange that the Dakar Convoy should arrive about four days after the H.G. West Coast Convoy, which in its turn had to sail from Gibraltar at a four-day interval from the H.G. East Coast Convoy.

(*f*) *Subsidiary Arrangements.* In addition to the above main arrangements, *Portsmouth* was required, when necessary, to provide "P" boats to relieve the Devonport escort off Spithead, and to take vessels up to Beachy Head or the Folkestone Gate, according to the submarine situation; and *Milford* was also required to relieve escorts in the Bristol Channel and to escort ships up to Liverpool or the Clyde.

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In the case of H.B. Convoys—direct convoys from New York to the Bay of Biscay—the destroyer escort was provided from *Brest* by the U.S. Navy. The French Navy also provided from *Brest* an occasional escort to meet ships detached for Bay of Biscay ports from East Coast Convoys; but, as a general rule, latterly in the case of H.H. and H.S. Convoys, these vessels were taken to Brest by the Queenstown Escort after the main convoy had been taken over by the Devonport Escort.

*Ocean Escorts.* In the report of the Convoy Committee it was estimated that 52 ocean escorts would be required for North Atlantic convoys. The only vessels available from British sources at the time of that report were 12 armoured and protected cruisers. The vessels first utilized as "ocean escorts" for North Atlantic homeward convoys were protected cruisers, but these were shortly afterwards reinforced by "commissioned escort ships," and by armed merchant cruisers released from the 10th Cruiser Squadron. The entry of the United States into the war and the consequent control of exports from that country by means of agreements and embargoes enabled us gradually to reduce the strength of the 10th Cruiser Squadron and eventually to abolish it. For convoys from New York, United States protected cruisers were allotted.

For South Atlantic convoys, armed merchant cruisers from the west coast of Africa station (9th Cruiser Squadron) supplemented by vessels from the 10th Cruiser Squadron were utilized.

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For Gibraltar convoys, special service ships ("Q" ships) were first detailed, but two United States small light cruisers and several United States coastguard gunboats became available later and were used both for outward and homeward Gibraltar convoys. Two British small light cruisers were added in 1918. In some cases the "intermediate" outward convoy to Gibraltar had no ocean escort or was provided only with a patrol gunboat after leaving the home submarine danger zone.

### Protection From Attack by Surface Vessels

The protection of the Atlantic and Scandinavian convoys from attack by surface vessels lay in the hands of the Commander-in-Chief of the Grand Fleet. As soon as the Atlantic convoy system was started, he was informed of the general procedure, and supplied with a copy of the Secret Routeing Chart; the programmes of convoy sailings and information regarding dates of sailing and routes were given him by telegraph or letter as soon as a convoy sailed.

He was also informed of the positions at which homeward-bound convoys would cross certain longitudes and this information enabled him to fix approximately the position of a convoy at any particular time; he was also given the dates of departure and arrival at the destroyers' rendezvous, together with the position of that rendezvous.

In 1918, when large troop convoys were crossing from the United States and it was felt that a battle-

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cruiser attack on these convoys might be anticipated, special arrangements were made for their protection by Dreadnought battle-ships. By September, 1918, three U.S. Dreadnought battle-ships had arrived at Berehaven, whilst others were available at ports in the United States.

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# CHAPTER XI

## DEVELOPMENT OF THE CONVOY SYSTEM

FROM the commencement of the convoy system, constant efforts were made to bring more and more of the trade under convoy. There were two reasons for this—(1) because of the success of the early experimental convoys in avoiding loss; (2) because the trade not under convoy was being given less and less protection by reason of the absence of protecting vessels owing to their being utilized for the convoy system.

The Anti-Submarine and Convoy organizations of the Admiralty were continuously doing everything possible to bring more and more of the trade under convoy; and, perhaps naturally (though unnecessarily) the War Cabinet was urging upon the Admiralty to endeavour to carry out the same object.

In July, 1917, for instance, the Admiralty was requested by the War Cabinet to consider the redistribution of the anti-submarine craft at their disposal, in order to provide the necessary destroyer escort for a daily inward convoy system. At this period we were 33 vessels short of requirements for such a system. The provision of a smaller escort for con-



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voys than had hitherto been considered necessary was even suggested by the War Cabinet. At that time about 50 per cent. of the incoming trade was under convoy, and 44 destroyers and 22 sloops were available for escort and patrol duty. This included 11 U.S.A. destroyers.

I had already gone thoroughly into this question. It would have been highly dangerous to reduce the strength of the already weak escorting force, and in order to show the position clearly, a full statement was furnished to the War Cabinet as to the employment of our whole destroyer force. It was pointed out that with the exception of a portion of the 100 destroyers with flotilla leaders allocated to the Grand Fleet, a few of those belonging to the Harwich Force and the Dover Force, and 4 mine-laying destroyers engaged entirely in mine-laying operations against submarines, the *whole* of our destroyer and sloop force was already engaged in trade protection either in the English Channel escorting transports, hospital ships, store and ammunition ships across the Channel, or engaged on the East Coast on convoy and patrol work. It was pointed out that the only places from which we could obtain more destroyers were from the Grand Fleet, the Harwich and Dover Forces, and that it was quite impossible to weaken further the destroyer strength of these forces.

The allocation of the 100 *Grand Fleet* destroyers at this period was as follows:—

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38 were engaged directly on trade protection, namely:—

| | |
|---|---|
| Protecting trade between Aberdeen and the North | 4 |
| Protecting the Scandinavian trade | 7 |
| Protecting trade passing the West coast of the Shetlands | 2 |
| Protecting trade on the North coast of Ireland and the South-west coast of Ireland | 11 |
| Escorting oilers | 6 |
| Sweeping the Norwegian coast in search of raiders | 4 |
| Engaged (it was thought successfully) against a submarine between Lerwick and Norway | 4 |
| Total: | 38 |

Those not engaged directly on trade protection included:—

| | |
|---|---|
| Mine-laying against enemy submarines | 2 |
| Patrolling outside Fleet bases to prevent attack by submarine and mine-laying | 6 |
| Refitting at dockyards or private yards | 17 |
| Boiler cleaning and carrying out local refits at other bases | 12 |

A total of 75 was thus accounted for out of the 100. There were in addition 9 flotilla leaders. If the Grand Fleet put to sea to meet the High Sea Fleet, we could not, in these conditions, depend upon there being with it a total of more than about 40 destroyers—including some of those refitting locally—with 9 flotilla leaders, and that was certainly not a sufficient force adequately to

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screen even the capital ships of the Grand Fleet. No more destroyers could therefore possibly be taken from the Grand Fleet without immobilizing a large portion of it. In this connexion, on p. 37 of his book, Admiral Sims mentions the criticisms which he states he found in the United States on the subject of our keeping 100 destroyers with the Grand Fleet instead of detailing many of them for anti-submarine work and convoy escort. He states very emphatically his opinion (which was, of course, the opinion held by every officer in the British Navy) that any disaster to the Grand Fleet would have meant the loss of the war. One of my difficulties during the year 1917 was to make the Prime Minister realize the fact that the whole of the Allied cause was dependent upon the Grand Fleet, together with the Harwich and Dover Forces, being in a position to hold the surface command of the sea.

So far as the *Dover Force* was concerned, the modern destroyers were the only ones not directly engaged in escort work, i.e. trade protection. If any reduction in the modern destroyer strength at Dover were made, it would be quite impossible to carry out the essential work of that force, viz. the work on the Dover Barrage and the safeguarding of mercantile traffic against attack from enemy destroyers working from Zeebrugge and Ostend. Any reduction would be absolutely disastrous.

The destroyers of the *Harwich Force* were all engaged directly in the protection of the Dutch trade at least once a week, and oftener if possible. In addition, about half of them were used to reinforce the Dover flotilla during

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the dark period in each month. They were also used for covering mine-laying operations in the German Bight, for preventing attacks by German destroyers on the shipping, local patrol and mine-sweeping forces on our South-east coasts, or for attacking any German light forces working from Ostend and Zeebrugge in directions other than the Straits of Dover.

### A Review of the Trade Position made in September, 1917.

A review of the convoy system was drawn up early in September, 1917, in order to show the position in regard to convoy and trade generally at that time. It was stated in this review that during the previous three months, great advance had been made in the development of mercantile convoy and much valuable experience gained in the organization, sailing, and conduct at sea of such convoys. Emphasis was laid upon the importance of an efficient and detailed organization for this work. Amongst the points mentioned were the following:—

*The selection of and organization at collecting ports.* In selecting these ports consideration was necessary in regard to their geographical situation and their suitability for affording safe anchorage to a large number of ships.

*Duties at a convoy base.* The duties of the staff at each base were mentioned. Stress was also laid upon the importance of the duties of the captain of the escort cruiser, and the necessity for his arrival at the collecting port a few days before the convoy sailed, in order that he might assemble the masters of the ships and explain the instructions, etc., to them.

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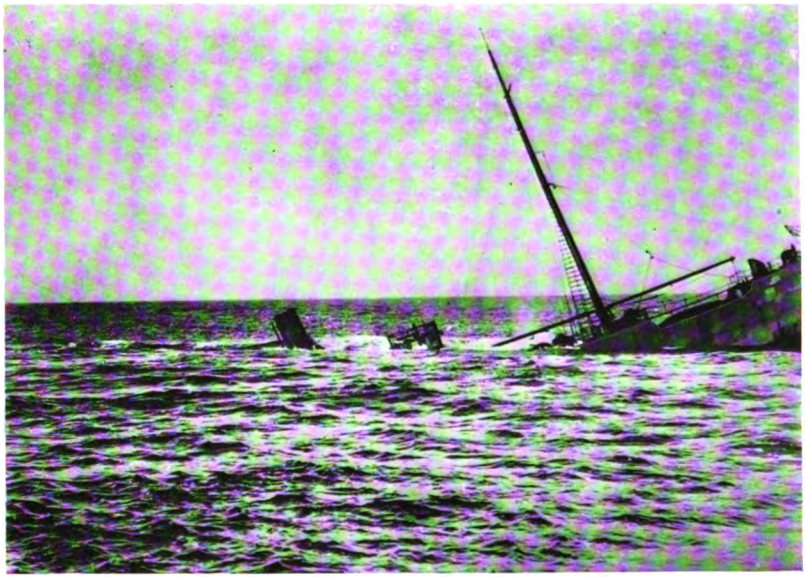

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MORE VICTIMS OF THE SUBMARINE WARFARE.

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*Cruising formation of a convoy.* Experience had shown that the broader the front of the cruising formation of the convoy, the better it was protected against submarine attack; it was found that merchant ships preserved much better station in line abreast than in line ahead.

*Size and speed of convoy.* It was stated that about 20 vessels was considered to be the best number for convenience and handling, as the signalling became difficult in large convoys. As regards the *speed* of the convoy, it was mentioned that convoys were divided into two categories—those with a sea-speed of less than 12½ knots and those of a speed of between 12½ and 16 knots.

*Signalling arrangements.* The great importance of the arrangements for *signalling and wireless communication* was emphasized, it being pointed out that long range wireless signalling was essential to the effective control of a convoy, its main function being to provide the means by which a convoy could be diverted so as to avoid a locality in which enemy submarines were operating, and to give timely information of the progress of the convoy, in order that the sailing of the destroyer escort might be advanced or retarded as necessary.

It was stated that, speaking generally, the principle of convoy could be regarded as having proved successful. It was, however, pointed out that as bad weather might soon be expected and recent experience had proved the extreme difficulty of keeping a large number of merchant vessels together in such weather, it could not be definitely stated that during the winter months, particularly in the



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outward trade, the convoy system would remain as successful as it had proved to be up to September. The main difficulty experienced in regard to the outward trade lay in the fact that so many of the vessels engaged in it started in ballast and very light, which

ATLANTIC

HOMEWARD CONVOYS TO U.K. AND FRENCH (ATLANTIC COAST

| *Areas served* | *Assembly Port* | *Speed Limits* | *Frequency* | *Destination East or West Coast* |
|---|---|---|---|---|
| Canada. | Sydney, C.B. | 8½ to 12½ | Every 8 days. | E. & W. alternately. |
| Portland (M), Boston, New York. | New York. | do. | Every 8 days. | do. |
| Philadelphia and Ports south to Colon, including Gulf and West Indies. | Hampton Roads. | do. | Every 4 days. | do. |
| All N. America. | Halifax. | 12½ and upwards. | Every 8 days. | W. only. |
| Brazil, Argentine and Eastern ports. | Dakar. | 8½ to 11½. | Every 8 days. | E. & W. mixed. |
| Do. | Sierra Leone. | 11½ and upwards. | Every 8 days. | do. |
| Mediterranean and Huelva. | Gibraltar. | 7 and upwards. | Every 4 days. | E. & W. alternately. |

Total convoys in 8 days—9. Total ships convoyed every 8 days—152. Total ocean escorts—49.

The total force at present employed for submarine danger zone, i.e.—Destroyer Escort, is:—

70 Destroyers (including 22 U.S.A. Destroyers.) 11 Sloops. 48 Trawlers.

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added immensely to the difficulty of station-keeping in bad weather conditions.

The Table on these pages is taken from the report and shows the position that had been reached by September, 1917.

CONVOYS

AND CHANNEL PORTS) AT PRESENT IN OPERATION.

| *Average No. of Ships in Convoy every period of 8 days* | *No. S/M Zone Escorts* | *Composition of S/M Zone Escorts* | *No. Ocean Escorts* | *Composition of Ocean Escorts* |
|---|---|---|---|---|
| 18 | 1 | 6 destroyers, 5 sloops. | 5 | British Cruisers. |
| 18 | 1 | 5 destroyers, 6 sloops. | 6 | U.S. Cruisers. |
| 44 | 2 | 22 destroyers. | 12 | 4 British Cruisers, and 8 Specially Armed Merchant Escort Ships with 3·6-inch Guns. |
| 12 | 1 | 11 destroyers. | 5 | Armed Auxiliary Cruisers. |
| 16 | 1 | do. | 6 | British Mercantile Auxiliary. |
| 10 | 1 | do. | 5 | British Mercantile Cruisers. |
| 34 | 2 | 4 destroyers. 48 trawlers. | 10 | 6 Special Service Vessels, 3 Armed Boarding Steamers. 1 Sloop temporarily attached. |

In addition to the above, the following forces are employed on subsidiary escort duties in connexion with the above convoys—Destroyers, 11. "P" Class, 15.

Danger zone escort at Gibraltar consists of various Sloops, Yachts and Torpedo Boats, and will shortly be reinforced with 22 U.S.A. vessels under Admiral Wilson, U.S.N.

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The position as regards outward convoys at the time is shown in the following Table.

OUTWARD CONVOYS FROM U.K. AND FRENCH CHANNEL PORTS AT PRESENT IN OPERATION.

| *Area Served* | *Assembly Port* | *Speed Limits* | *Frequency* | *Bound for* | *No. of Ships* |
|---|---|---|---|---|---|
| Irish Sea and Clyde | Lamlash | 8½ to 13 | Every 4 days | North and South Atlantic | 32 |
| Bristol Channel | Queens-town | do. | do. | do. | 24 |
| East Coast and Channel Ports | Plymouth | do. | do. | do. | 30 |
| Irish Sea Clyde and Bristol Channel | Milford Haven | 7½ to 11 | do. | Gibraltar and Mediterranean | 48 |
| East Coast and Channel Ports | Falmouth | do. | Every 8 days | do. | 16 |

Total ships every 8 days. . . 150

Total convoys out in 8 days . 9

*Note.*—The destroyer force proceeding to meet homeward-bound vessels, escorts the outward vessels to a position about 400 miles from the coast, where they disperse and proceed independently.

As previously mentioned, separate destroyer escort to the outward convoy had been impossible, as there were not sufficient destroyers available for the purpose. It was stated in this review that the question whether

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in bad weather, owing to consequent possible delays, the same destroyer escort that took out the outward convoy, could meet and bring back the homeward convoy, was one which only experience could decide. It was further mentioned that 12 more cruisers were required to provide the ocean escort needed for the outward convoy system.

The additional force that would be required to extend the Atlantic convoy system so as to embrace the remaining trade traversing the Atlantic was then given. This trade comprised:—

(*a*) The trade from the United States to Gibraltar.
(*b*) The south-east coast of America to Dakar.
(*c*) Cape Town and Durban to Dakar.
(*d*) The south-east coast of America to Gibraltar.

The presence of an ocean going submarine (U 155) in June emphasized the necessity for convoys off the West African coast. It was stated that:—

As regards (*a*) a convoy would be needed every six days, necessitating 9 ocean escorts and one additional destroyer escort at Gibraltar.

As regards (*b*) convoys would be required to sail every 8 days and 8 ocean escorts would be needed.

As regards (*c*) it would be necessary to sail the convoys from Cape Town every 8 days and 8 ocean escorts would be required.

For (*d*) it was proposed that the ships should be detached from the Dakar or Sierra Leone Convoy when in the vicinity of Gibraltar.

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Summing up, it was stated in the review that for this complete Atlantic system 41 more ocean escorts would be required and 55 more destroyers or sloops.

### Mediterranean Trade

At the end of January, 1917, an Allied Naval Conference had been held in London to consider the method by which joint action between Great Britain, France, Italy and Russia could be best brought into being to deal with the growing submarine menace to shipping. The principal matters discussed were the arming of merchant ships, the provision of ships and weapons for offensive action against submarines, the reduction of imports, the saving of mercantile tonnage wherever possible, and the best methods for protecting shipping in the Mediterranean.

In regard to this latter question the main difficulty was due to the fact that the three Mediterranean Powers —England, France and Italy—had been, up to the date of the Conference, each responsible for the protection of shipping in certain areas in the Mediterranean, and different ideas prevailed as to the best method of protection.

The following decisions regarding protection of shipping had been reached at the Conference:—

*In the Western Basin* of the Mediterranean it had been agreed:—

That the coastal route should be utilized as much as possible, and that each country should decide as to whether their vessels should take the direct route from

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Marseilles to Algiers, that is, by the route arranged by the French Ministry of Marine.

That the question of protection of certain ports by nets should be looked into, and if the British Government could spare any nets they should communicate with the Ministry of Marine at Paris and Rome as to where they would suggest these nets should be placed.

*In the Eastern Basin* of the Mediterranean it had been agreed:—

To adopt the proposed French system of fixed routes, frequently changed, for traffic to and from Salonica and the Ægean, and to adopt the proposed English system of dispersion for traffic between Cape Bon and Port Said both for British and Allied vessels.

That the British would undertake to maintain the patrols on the French routes, and that no patrol vessel would be diverted from these patrols for employment in connexion with the dispersed routes. After a period of trial the working of the two systems was to be compared at a joint conference with a view to the adoption of a permanent system.

The losses in the Mediterranean during the first half of 1917 had been very heavy under this arrangement.

In the General Review of the position the question of introducing a convoy system in the Mediterranean was discussed. It was mentioned that the question was being considered at Malta, and that a definite scheme was in course of preparation by an Allied committee, presided over by the new British Commander-in-Chief,

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Mediterranean, Admiral Calthorpe, who had discussed the matter in Paris and Rome on his way to the Mediterranean. The basis of the proposals that were being discussed was as follows:—

(*a*) A convoy every 4 days between Gibraltar and Genoa and vice versa. Number of ships in convoy, 24 out, 18 back.

(*b*) A convoy every 8 days from Gibraltar to Bizerta and vice versa. Number of ships in convoy, 16 out, 22 back.

(*c*) A convoy from Marseilles or Toulon to Bizerta every 8 days. Number of ships in convoy, 20 out, 22 back.

(*d*) A convoy from Bizerta to Naples and vice versa every 8 days. Number of ships in convoy 10 out, 7 back.

(*e*) A convoy from Bizerta to Port Said or Alexandria and vice versa every 8 days. Number of ships in convoy, 16 out, 17 back.

(*f*) A convoy every 8 days or as necessary from Malta to Suda Bay. Number of ships in convoy few and irregular.

(*g*) A convoy from Port Said to Suda Bay and vice versa every 8 days. Number of ships in convoy, 7 out, 8 back.

(*h*) A convoy from Suda Bay to Salonica and vice versa every 8 days. Number of ships in convoy, 15 each way.

(*i*) A convoy from Malta to Taranto and vice versa

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A Convoy making a Zig-zag Course.

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every 8 days. Number of ships in convoy, 5 out, 4 back.

(*j*) A convoy from Oran to Gibraltar every 8 days. Number of ships in convoy, 6 each way.

The total number of destroyers, sloops and trawlers required for the above system of convoy, plus the through convoy from Gibraltar to Alexandria and vice versa was 286. The number available in the beginning of September was 212, leaving a balance of 74 to be provided. It should be mentioned that troop movements were not included in the above arrangements.

### The Scandinavian Convoy

The position as reviewed in September, 1917, was as follows:—

All British, Allied or neutral merchant ships of a speed of 7 knots or more were allowed to be included in the convoy. The different convoys were:—

Between the Humber and Lerwick.

Between Lerwick and Bergen.

Between Lerwick and Loch Ewe (West Coast convoy).

Between Tyne, Firth of Forth and Lerwick (a coastal convoy).

In the Humber–Lerwick convoy (distance 420 miles), a daily convoy, the maximum number of ships allowed the escort consisted of 2 destroyers and 5 or 6 trawlers, which were based on the Humber.

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The Lerwick–Bergen convoy (distance 200 miles); convoy every 3 days out of 4, the maximum number of ships as escort was 10—3 or 4 destroyers and 2 or 3 trawlers, based on Lerwick.

The Lerwick–Lock Ewe convoy (distance 220 miles); convoy twice a week, maximum number of ships allowed, 6, escort 2 to 4 trawlers, based on Stornoway.

The Tyne–Firth of Forth–Lerwick convoy was for vessels from the Tyne to the Firth of Forth and from the Firth of Forth, Aberdeen and Peterhead to Lerwick. 6 ships was the maximum. A trawler escort was provided by the different bases.

### The French Coal Trade

In the General Review it was stated that this coal trade in September, 1917, was run in four crossings from the English coast to the French coast.

The *first* was from Mount's Bay to a rendezvous off Ushant for vessels of 8 knots speed and over, bound for Brest and Bay of Biscay ports. They were met at a rendezvous off Ushant by French vessels which piloted them to their ports.

*No. 2 Crossing, from Weymouth to Cherbourg.* This was for colliers bound for ports as far west as Morlaix, with 8 knots speed. This was a general crossing for the slower ships and was selected because it was the shortest possible route for them, enabling them to get across the Channel in the dark hours. The escorting trawlers went into Cherbourg and waited there to escort the empty colliers back the next day.

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*No. 3 Crossing, from St. Helen's Bay to Havre* for colliers of 8 knots and over bound for Havre, Trouville, Harfleur, Caen and Fecand, escorted by British trawlers to a rendezvous 10 miles from Cape la Heve, the escort then returning.

*No. 4 Crossing,* colliers from English coast ports to Dieppe and Dunkirk and colliers of under 8 knots speed bound to ports as far west as Caen. These vessels assembled at Southend and crossed entirely without escort to the French coast from the Downs.

About 360 vessels were employed on the French coal trade from Bristol Channel ports, the daily average of sailing being about 30. The average number of vessels sailing from Newcastle was 60 a week, from the Humber 60 a week, and 81 a week from Glasgow and Liverpool. About 1,600,000 tons of coal were shipped for the French marine trade every month.

This concluded the Review of the situation in September, 1917.

## The Supply of Oil Fuel in 1917

It is important to note the special protection which it was necessary to afford to vessels bringing oil to the United Kingdom in 1917, as owing to the heavy losses of oil tankers our reserve of oil fuel for the Fleet was becoming dangerously low. The shortage of oil fuel reserves commenced to become serious towards the end of April, 1917, at the time when the institution of a convoy system was becoming practicable. The very serious situation that arose, is indicated in a minute

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put forward on June 6, 1917, by the Fourth Sea Lord. He stated that "The situation as regards oil is critical under the present circumstances. Oilers must be considered the most valuable vessels afloat. They should be convoyed. If a convoy call twice a week from Hampton Roads it is anticipated that no delay in delivery of oil would be caused. South-about oilers call at Queenstown, north-about oilers at Kirkwall. I consider that destroyer escorts should be provided for coast-wise voyages." It was not possible, owing to shortage of destroyers, to carry out entirely the suggestions of the Fourth Sea Lord, but elaborate arrangements were made, and as far as possible carried out, for the protection of oil tankers. Prior to the introduction of convoys, "requisitioned oilers" had been ordered to call at a United Kingdom port for orders (usually Queenstown), where they received instructions regarding where they were to discharge. It was not practicable to fix their port of discharge earlier as the oil situation altered materially during the period of their homeward voyage, e.g. if the Grand Fleet put to sea for some days, the requirements of Scapa or Rosyth would at once increase. On the introduction of the convoy system their port of discharge was communicated through the destroyer escort, which also furnished the oiler with the necessary local route instructions for that port. It was necessary, however, to provide for these vessels in case they became separated from the convoy, as it was essential that every vessel (both before and during the convoy system) should have

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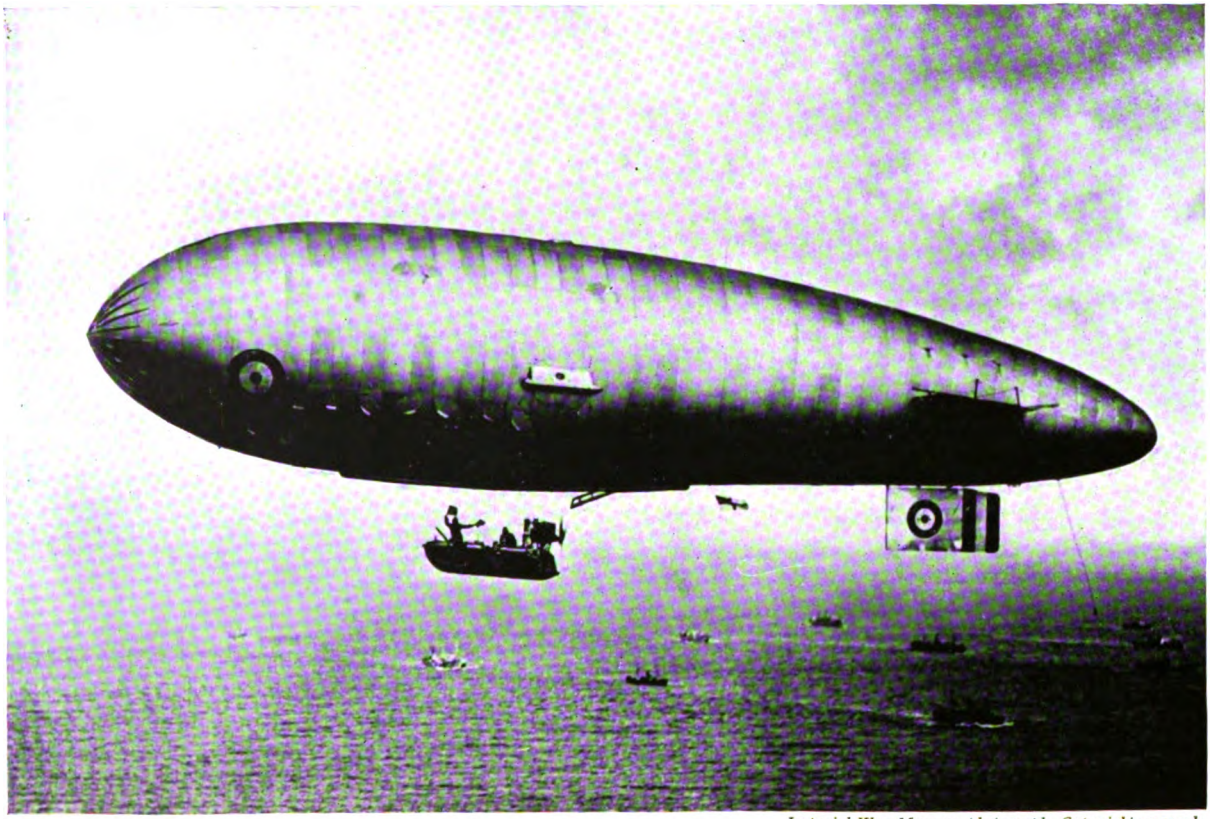

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ZERO NON-RIGID AIRSHIP ESCORTING A CONVOY.

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route instructions for a definite port. Oilers in East Coast convoys were given a "separation route" to Devonport, those in West Coast convoys to Lamlash. In the case of oilers from North America with supplies for the Grand Fleet, the Grand Fleet provided a destroyer escort for them from Lamlash—or from Lough Swilly, if met there—up to Scapa. Such oilers as were separated from convoy and came to Lamlash had to proceed through a danger zone independently, and had there to be escorted North. Orders were accordingly issued on August 19, that all oilers coming in convoy should be cleared and routed to Devonport if in East Coast convoy, or to Kirkwall if in West Coast convoy, and should proceed to these ports respectively, if they lost touch with convoy and so failed to receive the orders sent out by destroyer escort.

On the institution of H.X. Convoys, the fast oilers (over 12 knots), were included in them, and, as far as practicable, all the fast oilers were then brought to the West Coast.

As is now well known, fuel oil was also brought home in the double bottoms of all ships in which it could be stowed.

The above facts indicate the inaccuracy of the statement made by Mr. Winston Churchill on p. 171 of his "World Crisis 1911–1914," in regard to the sufficiency of our fuel reserves for war. He describes the action which I took as Second Sea Lord in pressing for an increase in our oil fuel reserves. I had urged that the reserves should be increased from 3 to 6

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months' war expenditure and Mr. Churchill, who resisted my efforts, states that the reduced scale of reserves accepted *stood the tests of war*. It will be seen from the foregoing how far this was from being true. One of my greatest anxieties in 1917 arose from the shortage of oil fuel in the country. It became necessary to issue orders limiting the speed of warships of all classes unless in the presence of the enemy.

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# CHAPTER XII

## MINES AND MINE-SWEEPING

ONE of the dangers attendant upon the working of a convoy system was that of a convoy running into a mine-field, when very heavy loss would be involved. It therefore became essential when the convoy question was under consideration that every possible precaution should be taken to keep convoy routes and the vicinity of ports of assembly clear of mines, and the greatest efforts were consequently made to cope with this danger.

When I came down from the Grand Fleet to the Admiralty in December, 1916, I asked that Captain Lionel Preston, C.B.,[1] who had performed most valuable work in the Grand Fleet in command of our mine-sweeping flotillas, should be appointed as the head of the mine-sweeping services at the Admiralty, and he at once inaugurated a big increase in the mine-sweeping organization.

Amongst other steps taken was that of fitting all the patrol craft round the coast for mine-sweeping work, in addition to the other duties carried out by them, so that they could be used in emergencies for that operation. In fact, every available small craft was

[1] Now Admiral Lionel Preston, C.B.



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pressed into the service, including a considerable number of motor-launches. Orders had been placed early in 1917 for a large addition to the "Hunt" class of mine-sweeper, but great delays occurred in the building of these vessels, and although 100 extra ships had been ordered in 1917, only 16 were completed by the end of the year.

Captain Preston's organization was used most effectively by the various senior officers on the coasts and at the ports, and no praise can be really adequate for the splendid work which was carried out by the gallant officers and men who manned our mine-sweeping craft. This work was exceedingly arduous and very dangerous, and there was, of course, no prospect of the mine-sweeper being able to get a "hit back" at the mine-layer.

Our losses in mine-sweeping vessels afford evidence of the danger of the work. During the second six months of 1916, the average number of these craft sunk or damaged by mines was 5·7 per month. For the first six months of 1917, this average rose to 10 per month, but was happily reduced in the last half of the same year to 4 per month, although during that period far more mines were being swept up. The reduction was probably due to more efficient organization, as the result of experience.

The losses incurred by our merchant ships through mines were similarly reduced. In the first six months of 1917, 90 ships were sunk or damaged, and only 49 in the last half of that year.

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The following figures are also of interest in this connexion. During the year 1916 some 2,000 mines were swept up by our vessels, whilst in 1917 the total was approximately 4,000. It is again interesting to note the reduction in the monthly number of mines swept up towards the end of 1917 and at the commencement of 1918, as compared with the earlier months. From February to September, 1917, the average number swept up monthly was 420. From October, 1917, to March, 1918, the average fell to 180 per month, this reduction being partly due, presumably, to our success in sinking German mine-laying submarines during the latter part of 1917, and partly also to the work of the anti-submarine patrol forces, naval and aerial, in locating and harrying these vessels.

By the end of 1917, our regular mine-sweeping force comprised 726 vessels, of which 412 were trawlers. The increasing number of German U.C. mine-laying submarines necessitated the increase in our mine-sweeping force, together with the fact that, as was natural, one German reply to our convoy system was the laying of mine-fields off headlands on convoy routes and off convoy ports of assembly and points of convoy dispersion. Much mine-laying was carried out off the Shetlands (Lerwick), the West coast of Ireland, off Lough Swilly, Belfast, Mull, Stornoway, Liverpool, off the West and South coasts of Scotland, and generally in the Irish Sea and English Channel, but by far the greatest portion of the mines swept up were laid in the Nore, Harwich and Lowestoft area. This was, no doubt,



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because this particular area was nearest to the submarine base at Zeebrugge, and another reason was the fact that the major part of the East Coast of England traffic passed through it. One-third of the mines swept up in the first half of 1917 came from this area alone, as also did the greatest number of casualties to merchant ships from mines during the same period.

So far as our information went in the year 1917, it was to the effect that at the commencement of the year the Germans possessed 34 U.C. boats and they added 30 more to this total during the first quarter of 1917. The submarine mine-laying was a very difficult problem with which to deal. The German methods were constantly being changed, and each change when ascertained probably involved some alterations in our own mine-sweeping policy. Their early method of laying the whole of one submarine's mines in a comparatively small area was fairly easy to deal with, but when the mines began to be more scattered, it became increasingly difficult to ensure a channel clear of mines, and the most difficult problem of all which was set us by the Germans was their introduction of a delay-action device in their mines, the arrangement being such that the mines remained at the bottom for varying periods after being laid. It was found in October, 1917, that a delay of as much as four days between the time of laying the mine and its release was being arranged for. The ordinary mine-sweeping method was not effective against a mine on the bottom, and the danger was that the mines would rise and make the channel dangerous

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after it had been swept by ordinary methods and reported clear. A chain sweep was introduced to work along the bottom to cope with this device, but naturally on a rocky bottom it was not always easy to use it effectively. Another German practice which gave considerable trouble was that of mine-laying submarines following the mine-sweepers as they finished their work and laying a fresh mine-field in the area just swept clear.

A further difficulty which had to be faced was the fact that when a channel was swept and buoyed—buoying was necessary where the traffic was heavy—the buoys gave the enemy information as to where to lay fresh mine-fields. One method adopted by us to deal with this difficulty was to lay defensive deep mine-fields outside the swept channel, in the hope that German submarines would commit suicide on these mine-fields. Other devices were the mining of a false buoyed channel and the shifting of the position of light-vessels and buoys with the object of putting submarines ashore.

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# CHAPTER XIII

## A GENERAL SURVEY

IN this final chapter the whole question of the intensive submarine war is shortly reviewed.

In the first two years of the war our Allies and ourselves suffered considerable losses in merchant shipping due to submarine and mine attack, and the Admiralty were faced with a heavy and difficult task in providing and organizing the immense number of trawlers, drifters, etc., found necessary to cope with the danger. The shortage of destroyers, too, was most serious. Up to a late date in 1916 all new destroyers had to be allocated to the Grand Fleet or Harwich and Dover Forces. The position in regard to merchant shipping did not become serious until the autumn of 1916. It became very critical when unrestricted submarine warfare was commenced on February 1, 1917. During 1915 and 1916, however, it was clear that the submarine as used by the enemy against trade, might eventually create a very dangerous situation, and for that reason I held the opinion that we should prepare for a probable emergency by increasing our output of merchant ships and of fast craft suitable for anti-submarine work, and should also take some steps in regard to the provision of reserve food supplies. These views I had expressed. When the crisis came, it found us and our



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Allies unprepared. In addition to our own entire dependence on the import of food and raw material by sea, we had to use a considerable portion of our available merchant shipping in work for our Allies, in supplying, for instance, coal to France and coal and steel to Italy. We were also using a large number of merchant ships for our overseas military expeditions.

After February 1, 1917, we continued all this work, although the command of the sea was in the hands of the enemy submarines, and the strain upon our Naval forces was far more than they could properly cope with. The result, of course, was a terrible tale of sunk shipping and loss of life. Never before, in any war, had serious military expeditions been successfully embarked upon, or carried out, without the command of the sea being first assured. For seven months, February to August, inclusive, the situation remained critical, after which the counter measures introduced reduced the danger, and it seemed probable that the submarine was vanquished, although serious losses could still be inflicted upon merchant shipping.

The measures which defeated the submarine were:—

1. The successful organization of a complicated general convoy system for the protection of trade; this was only made possible at the date adopted, by the entry of the United States into the war.
2. The institution of various offensive measures. By the middle of 1917 these measures were beginning to become effective. Many of them (including the provision of depth-charges, new

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pattern mines, and air-craft) involved a large output from factories, and for that reason they took time to mature; some, such as hydrophones, were of a nature which required experience in use before they gave good results; some necessitated the use of vessels which had to be built, or taken from other services so far as was possible.

The Convoy system, when in full operation, reduced immensely the losses in merchant ships passing through the submarine zone; but considerable losses were still incurred amongst ships proceeding to their ports of discharge after the convoy had reached its arrival base, or after dispersal. But the convoy system, by itself, did not, in 1917, cause the destruction of German submarines, and the only sure way of meeting the danger was to destroy submarines at a greater rate than they were being produced. The Admiralty, however, early in 1917, realizing the value of the depth-charge as an anti-submarine weapon, had placed very large orders for these devices. Towards the end of 1917 they were able to increase ten-fold the number of depth-charges issued to escorting vessels. As the result, escorting vessels did subsequently succeed in sinking some dozen submarines out of the total number of 132 sunk in 1917 and 1918; a small proportion, it is true, but a valuable addition to our other measures. Many others were attacked by depth-charges from escort vessels, and although they were not sunk, the effect upon the morale of the crews was considerable.

The main offensive, however, against the submarine

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was carried out by the hunting patrols, which consisted of:—

(*a*) Fast vessels such as Destroyers, "P" Boats, Sloops and Motor-launches.

(*b*) Slower vessels such as Yachts, Trawlers and Drifters.

(*c*) A combination of (*a*) and (*b*).

(*d*) Submarine patrols working in certain areas.

(*e*) Air-craft patrols working alone, or with the assistance of surface vessels.

And by:—

(*f*) The mine-fields in the Heligoland Bight, the North Sea Barrage, in the Straits of Dover, and off our coasts.

(*g*) Mine-nets in various places, particularly in the Straits of Dover.

The difficulty of destroying submarines is not generally realized even now. It is hoped that a perusal of this book will throw light upon the subject, and make clearer the immensity of the effort needed to deal with a vessel which can so readily disappear from sight, which can traverse very long distances under the surface of the sea, and which carries such tremendous weapons for under-water attack, viz. the torpedo and the mine. A summary of the forces opposed to one another say in November, 1917, may tend to an appreciation of this matter.

On the German side were some 178 submarines.

On the British side the forces in use to overcome these 178 submarines included approximately:

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| | |
|---|---|
| 277 Destroyers | 49 Yachts |
| 30 Sloops | 849 Trawlers |
| 44 "P" Boats | 867 Drifters |
| 338 Motor Launches | 24 Paddle mine-sweepers |
| 65 Submarines | 50 Airships |
| 68 Coastal Motor-boats | 194 Air-craft |
| | 77 Decoy ships |

In addition to this great fleet of vessels engaged in the war against the 178 German submarines, we laid over 10,000 mines in the last three months of 1917 in the Heligoland Bight and Straits of Dover, solely for the purpose of destroying some of these submarines, whilst in 1918, in addition to further very extensive mining in the Heligoland Bight and Straits of Dover, some 100,000 mines were laid in the North Sea Barrage. Can any better proof be afforded of the difficulty of anti-submarine warfare, than is given by these figures? They show clearly the immense effect on Naval warfare, and Naval policy, of the introduction of a completely new offensive weapon.

By the end of 1917, however, we were sinking submarines at a rate practically equivalent to the output of new vessels, and the situation could therefore be said to be in hand; combined as it was with a largely increased output in merchant shipping, which early in 1918 was in excess of the tonnage being sunk by submarine attack.

Of the various mine-fields, the one in the Straits of Dover planned in 1917, and to a considerable extent laid before the end of that year, was probably the most effective as regards the number of submarines destroyed. This was largely due to the fact that the Germans could

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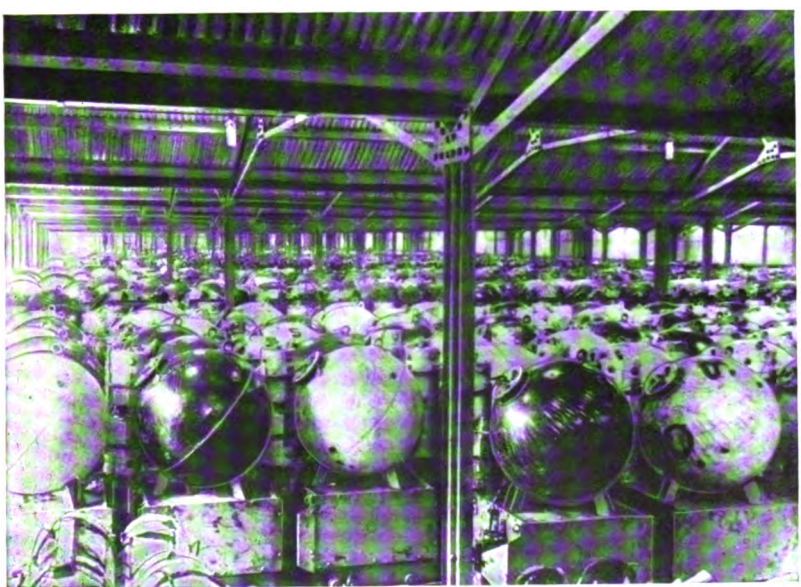
POWER PLANT, MINE-ASSEMBLING BASE; INVERGORDON, SEPTEMBER, 1918.



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INTERIOR OF A MINE STORAGE SHED, INVERNESS, SEPTEMBER, 1918.

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not sweep a channel through it, and that owing to its short length, it could be very closely patrolled. In the Heligoland Bight mine-field, channels could be, and were swept, but at the cost of many German surface vessels, besides the submarines destroyed by it.

The only change in Naval War Policy during 1918 was the decision come to by the War Cabinet that the Grand Fleet was no longer to do its utmost to force an action on the High Sea Fleet. I find it difficult to reconcile the decision thus arrived at with the views expressed to me by Mr. Lloyd George in 1917. In that year he pressed for more offensive action on the part of the Navy in general, and the Grand Fleet in particular, pointing out the superior Naval strength possessed by us as compared to the Germans.

The proper offensive action for the Grand Fleet was to seek engagement with the High Sea Fleet if an opportunity should arise, or if by any means the High Sea Fleet could be induced to put to sea. The 1918 decision cancelled this. The change of view was presumably due to a somewhat tardy realization by the War Cabinet of some of the dangers attendant upon a system of convoy for mercantile trade. The danger of surface attack on the Scandinavian Convoy brought about this change of view.

The only fresh offensive action taken in 1918 over that in operation during 1917, were the attacks on Zeebrugge and Ostend, which had been planned and approved of in 1917, and which it was intended to carry out early in 1918.

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# APPENDIX

SOME further details of the organization and working of the convoy system are given in the following pages. They are taken from an Admiralty Technical History of the Convoy System. They emphasize the reasons which made it impossible to institute the convoy system earlier and the dangers which a premature start would have involved.

They also show the immensity of the organization required for the successful working of the system, the large number of vessels needed for ocean and destroyer escort, the exceeding accuracy necessary to ensure that the convoys were met at the destroyer rendezvous at the arranged time, the steps taken to avoid delay in assembling and starting off the convoys from the ports of departure, the additional fittings and arrangements that had to be installed in merchant ships to enable station to be kept by ships in convoy and the instructions given to masters of merchant ships about to join a convoy.

It will be seen how great is the credit due to the Naval officers at the Admiralty who were responsible for the organization and working of the convoy system, to the staff of the Shipping Controller which rendered such valued assistance in this work, to the staff in ports of assembly abroad and at home which worked the system, and finally, and most assuredly, to the officers and men of



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the Mercantile Navies (British, Allied and Neutral), including Naval officers and men assisting them, who manned the escorts and ships in convoy, handled them with such dexterity, and imbued with so fine a spirit, brought them and their valuable cargoes safely to their destination.

*Shipping Arrangements.* The main purpose of the convoy system was to bring troops, cargoes—whether munitions, foodstuffs, or animals—for the Allies, and the whole of the arrangements for the provision of these cargoes rested with the Ministry of Shipping. The convoy system, from a Naval point of view had, therefore, to be adapted so far as possible to meet the requirements of troops or cargo. A compromise between Naval and shipping requirements had to be made in each case. It was also essential that every step possible should be taken to reduce the delay between the time that the ship was ready to sail and the time when the convoy was to leave. This object could best be obtained by pooling the resources at each port and by concentrating such resources on the ships that could catch the next convoy.

The Ministry of Shipping had representatives in New York, Washington, and in Canada, who controlled the loading and bunkering of ships on that side. In addition to this, early in 1918, shipping men of experience were sent to the convoy ports of North America to attend solely to the question of getting steamers loaded ready to catch the appropriate convoys, to supervise the quantity of bunker-coal taken, and to work in liaison

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with the Convoy Officer. Also at the port of Liverpool, and later at the ports of New York and London, Convoy Committees of shipowners were formed, working in close touch with the Port Convoy Officer, and these committees greatly facilitated and expedited the turn-round of ships by pooling their berths and facilities.

During 1918, as a result of these measures, the average total stay of tramps in United States ports fell from 27½ days in January, 1918, to 16¾ days in September, while that of liners was reduced from 22½ days to 14 days. The delay of "waiting for convoys" which had been 3½ days for tramps, was brought down to an average of 2 days, and the same cause of detention in the case of liners which had averaged as much as 5 days, was in September only 1½ days. The time spent in loading was in the case of tramps lessened by nearly 50 per cent. and that of liners by nearly 20 per cent.

The representatives of the Ministry of Shipping established close touch also with ships at the "out ports" (i.e. ports other than the assembly ports of convoys), and took steps to ensure the arrival of these vessels at the convoy port just before a convoy sailed—and not just after as had happened in some of the earlier convoys. When missing a particular convoy meant serious delay, it was left to the discretion of these representatives to shut out a 100 tons or so of cargo.

In connexion with bunkering these representatives were also particularly valuable; for with all the ships on time-charter and nobody in charge with any financial interest, the prejudice of the Master in favour of a light

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ship and of a large surplus of bunker coal had more play than would have been the case if he had to render a voyage account for consideration at the end of the trip. A system was therefore set up by which the Master had to state his speed, his total deadweight, his coal consumption, full speed, and (a very important point), the estimated consumption at convoy speed; and the supply of bunker coal which he could take was then regulated accordingly by the representative of the Ministry of Shipping. The quantity of surplus bunkers on arrival at home was tabulated at the Ministry of Shipping, and details were sent out weekly to North America. Ships loaded with measurement cargoes full, but not down to their marks, took some coal on deck, and thus reduced the demand on this side, when in the summer and autumn of 1918 coal was very scarce. In this and many other ways these representatives helped to make up for the absence of the financial consideration, which during normal trading times in peace, automatically calls attention to lack of forethought and supervision.

Endeavours were also made to remove from the Atlantic ships incapable of maintaining the minimum speed of the slower convoys, and it was a practice for officers in charge of convoys to report on arrival in the United Kingdom the names of any ships which, from lack of speed or otherwise, had detained the convoy or had dropped out of convoy. These reports were communicated to North America for guidance to future convoys. It was not practicable to eliminate all the lower-powered vessels, for many belonged to, or were

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neutral vessels chartered to, our Allies. Latterly, however, these slow vessels were routed independently to Berehaven, and they were then sent to the most convenient ports to discharge having regard to the submarine situation at the time.

Prior to the introduction of the convoy system, owing to the censorship of cables and the cessation of public information with respect to shipping movements, owners had been able to obtain but little information regarding the movements of their ships. With the introduction of the convoy system it was practicable without danger of information reaching the enemy to give owners, and others concerned, information about 48 hours in advance with regard to the probable time at which their ships would arrive, so that all possible steps could be taken in advance to expedite the turn-round.

*Convoys in Operation, June–July*, 1917. The success of the Gibraltar experimental convoy synchronized *with the realization that the supply of oil fuel for the Fleet was falling below requirements*. To afford protection to oilers from North America it was decided that the Hampton Roads convoys, the first of which had sailed on May 24, should be continued at an interval of about eight days, and that as many oilers as could be assembled should be included in these H.H. convoys.

On June 15, 1917, as a result of the success of the trial convoys from Hampton Roads and Gibraltar, it was decided to develop the system of convoys from Hampton Roads (H.H. convoys), at intervals of four days alternately for East or West coasts, and that all requisitioned

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oilers—whatever their original destination—which were ready when a convoy sailed should be included in that convoy. The East coast convoys were to be routed South-about, and the West coast, North-about, to be met by Devonport and Buncrana escorts respectively.

On June 22, 1917, the Commander-in-Chief, North America, was informed that the convoy system would be extended to ships from Canadian ports; and the first convoy from Sydney, Cape Breton (H.S. convoys), sailed on July 10, 1917. These convoys sailed at eight-day intervals, the first convoys, containing ships for both East and West coasts, being routed South-about and met by escorts of United States destroyers based on Queenstown.

In November, 1917, the port of assembly was altered to Halifax on the closing of the St. Lawrence. In July, 1918, Sydney (C.B.), was reverted to.

On July 6, 1917, the system was extended to ships sailing from Northern United States ports assembling at New York, the United States being now able to provide both ocean escort and destroyer escort, the latter being based on Queenstown. These convoys (H.N.) were at first composed of vessels bound for both East and West coasts and were routed via the South of Ireland. It was subsequently arranged that the H.S. and H.N. East coast convoys should arrive at intervals of eight days and that they should be routed South-about and met by a Queenstown escort, and similarly that the H.N. and H.S. West coast convoys should arrive North-about at intervals of eight days and that they should be met

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by a destroyer escort from Buncrana. Buncrana was thus required to meet two convoys every eight days (H.H. West coast and alternately H.S. or H.N. West coast). Queenstown met one convoy every eight days (alternately H.S. or H.N. East coast) and Devonport met one convoy every eight days (H.H. East coast).

On July 20, 1917, instructions were issued for regular convoys at four-day intervals to run from Gibraltar, sailing alternately for the East and West coasts and being met by escorts, composed mainly of trawlers, from Falmouth and Milford respectively. The first of these regular convoys (H.G.2) sailed from Gibraltar on July 26, 1917.

On July 31, 1917, instructions were given for the convoy system to be extended to the South Atlantic. Fast convoys, including ships of 10 knots and over, assembled therefore at Sierra Leone (H.L. convoys), slower convoys at Dakar (H.D. convoys).

*Introduction of "Outward" Convoys.* On August 11, 1917, arrangements were made for sailing ships from the United Kingdom in outward convoys through the submarine danger zone (O.D., O.Q., O.B., O.M., O.F. convoys). By the middle of August, 1917, it had become very noticeable that the enemy, failing to find the homeward-bound traffic as easily as before, was now devoting more attention to outward-bound vessels. In April, 1917, the proportion sunk had been 7 per cent. outward bound, as compared with 18 per cent. homeward-bound, but now, while the numbers of homeward-bound losses

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were rapidly decreasing, the sinkings of outward-bound tonnage were becoming more numerous and, in consequence, outward convoys were started in August, 1917. Owing to the limited escorting forces available, protection was only effected by requiring the destroyer escort which took a convoy out to meet a homeward convoy and escort it in. The destroyers escorted an outward convoy to the dispersal point, and then, after parting company with the outward convoy (usually after dark), steamed at such speed as was requisite, during the night, to the destroyer rendezvous for the homeward convoy. This greatly increased the need for exactness, and added very materially to the work of the destroyers. Formerly they had proceeded at full speed direct to the destroyer rendezvous of the homeward convoy, but now they had nearly two days of "zig-zagging" with the outward convoy. The flexibility of the arrangements was thus reduced almost to a vanishing point, for the programme had to be adhered to rigidly.

The following was the general procedure laid down on August 15, 1917:

MERCANTILE CONVOYS—OUTWARD AND HOMEWARD BOUND.
GENERAL PROCEDURE.

(1) Homeward-bound mercantile convoys (in the case of Sierra Leone a combined troop and mercantile convoy) will leave ports abroad, as shown on the enclosed programmes, and Destroyer Escorts from the ports named thereon will be required to meet them at the Rendezvous, which will be arranged from the Admiralty and notified to the Senior Naval



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Officers at the ports on which the Destroyer Escorts are based.

It is also under consideration to arrange fast combined troop and mercantile convoys from Halifax every eight days.

(2) The probable dates of arrivals at the Destroyer Rendezvous are shown on the attached statement.

(3) The Destroyer Escorts which proceed to meet the homeward-bound convoys will be required to escort the outward-bound convoy through the danger zone. The time of sailing and the Outward Route will be left to the Senior Naval Officer at the port of assembly to arrange, so as to suit the time and position given for the homeward-bound convoy. The outward convoy should be given a different route to that of the homeward convoy (the route of the latter will have been notified from the Admiralty); the time of sailing of the outward convoy should be so arranged that the Destroyer Escort can part company at dusk the night before it is due to meet the homeward convoy, thereby giving the Destroyer Escort time during the dark hours to pick up the track of the homeward convoy.

(*Note.*—It will not be necessary in all circumstances for the Destroyer Escort to accompany the outward-bound convoy to the limits of the submarine danger zone, provided the ships would be outside the danger zone by daybreak on the following morning.)

The meeting of the homeward convoy at the correct time and place must be the governing factor in cases of delays with the outward convoy, and this must be impressed upon the Senior Naval Officer of the Destroyer Escort.

(4) In assembling the outward convoys, other than the Gibraltar Convoys, they should be so formed that the Southern columns contain ships whose destination is to

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the southward, and the Northern columns the ships whose destination is to the northward.

Consideration should also be given to tonnage and horse-power, as well as to whether the vessels are in ballast or loaded; the number of columns should not exceed eight, and the number of ships in the outer columns should not exceed three, oilers and specially valuable ships being placed in the centre columns.

(5) Arrangements should be made and a plan supplied to each ship in the outward-bound convoy, so that the ships may make a wide dispersion when the Destroyer Escort parts company, irrespective of the actual destination of each ship.

It may be advantageous to disperse the convoy by columns at different times instead of by general dispersion at one time.

Each ship should be instructed on dispersal to proceed at the utmost speed for 24 hours, picking up the course laid down in her route instructions, as soon as sufficient time has elapsed for the convoy to be scattered according to the pre-arranged plan.

(6) A supply of Instructions for Masters (C.S. 04) and a set of Convoy Zig-zag Diagrams (C.B. 514) have been issued to the Senior Naval Officers at the ports concerned for use by the outward-bound convoys.

Opportunity should be taken to instruct the Masters verbally in regard to the general arrangements for conducting the convoy.

(7) In the case of mining activity off a port of assembly, or in the event of the port being closed, or other circumstance delaying the sailing of the convoy, the Outward Escort must in any case sail in time to meet the homeward convoy; if this necessitates the escort sailing without the outward convoy, the Senior Naval Officer may at his discretion sail the vessels

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of such convoy independently, giving them whatever route through the danger zone he thinks safest at the moment.

(8) A secret Chart will shortly be supplied to each of the Senior Naval Officers concerned (accompanied by special explanatory instructions), and this will be used for communicating to them the Destroyer Rendezvous and approach routes of the homeward-bound convoys.

The utmost secrecy is to be observed in regard to this Chart, as upon it the secrecy of the movements of the convoys depends.

Senior Naval Officers should intercommunicate as regards the routes given by them to outward-bound convoys so as to avoid the danger of the convoys meeting; 24 hours before convoy is to be sailed the Admiralty should be informed by telegraph of the route to be given (by the method shown on the Instructions supplied with the Chart), and as soon as convoy sails the names of vessels in the convoy and the final ports of destination of each vessel should be telegraphed to the Admiralty.

On October 12, 1917, instructions were issued for the outward convoys from Falmouth and Milford (O.F. and O.M. Convoys) to be kept together as complete convoys as far as Gibraltar, any ships for the North or South Atlantic being detached en route.

*North Atlantic System, August–September*, 1917. On August 23, 1917, instructions were issued for the formation of fast combined troop and merchant ship convoys (H.X. Convoys) sailing from Halifax with a minimum speed of 12 knots, later raised to 12½ knots. On September 8, 1917, an alteration was made as regards the Hampton Roads (H.H.) and the New York (H.N.)

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Convoys. The H.H. Convoys were in future to sail at eight-day intervals instead of at four-day intervals, but a medium-speed convoy with a minimum sea speed of 240 miles per diem was to sail from New York every four days bound alternately for East and West Coast. The speed of ships for this convoy was subsequently reduced to 9½ knots. This did not effect any increase in the total number of convoys, but it provided a medium-speed convoy from New York in lieu of one slower-speed convoy from Hampton Roads. An alteration was made as regards the provision of destroyer escorts, for H.N. Convoys were now met by Devonport (East Coast Convoys) and by Buncrana (West Coast Convoys), H.H. Convoys alternating with the H.S. Convoys, by Queenstown (East Coast Convoys), and Buncrana (West Coast Convoys).

*Through Mediterranean Convoys.*—It is necessary in connexion with the Atlantic Convoys to deal with the Through Mediterranean Convoys which were sailed between the United Kingdom (Devonport or Liverpool) and Port Said; for these vessels were in the Atlantic between England and Gibraltar and had to be fitted in to the general escort system of the Atlantic Convoys. Up to the time at which these convoys were instituted, the trade for India and the Far East had, owing to the heavy submarine losses in the Mediterranean, been diverted via the Cape of Good Hope. The Ministry of Shipping pointed out that if the Mediterranean and Suez Canal route could be used, the number of steamers which were then required to bring home essential cargoes

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from India and the Far East could be reduced by 40, and that these 40 ships would then be set free for employment on the North Atlantic trade. On the latter trade they could carry three times as many cargoes per annum as they were then doing via the Cape to India and the Far East. Moreover, the urgent increased requirements of coal for Italy had also to be met from British tonnage, and the tonnage required for this supply (about 100,000 tons of coal monthly) had to be taken from some other trade. It was pointed out that if the coal supplies for Egypt could be sent there in some of the ships proceeding to India or the Far East the slow ships which had hitherto carried this coal to Egypt could then be diverted to carry coal to Italy, i.e. ships which had hitherto proceeded to India and the Far East via the Cape in ballast or with miscellaneous cargo would now be loaded with coal which they would discharge at Port Said on their way to the East. It was, therefore, apparent that very great gain in tonnage could be achieved by directing both Homeward and Outward Eastern trade through the Mediterranean instead of via the Cape. It was decided accordingly, in view of the severe tonnage limitation, to make a trial of sending this traffic through the Mediterranean, and further, it was decided to restrict the system to vessels able to maintain a sea-speed of 10 knots between Port Said and England. The first of these convoys, O.E. 1, sailed from England on October 3, and the first Homeward Eastern Convoy (H.E. Convoy) assembled and sailed from Aden on November 7. The first O.E. and H.E. Convoys met

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with considerable losses which very nearly caused the system to be discontinued. The third, fourth and fifth Outward Convoys and the third and fourth Homeward Convoys were very successful, but losses in later convoys led to further doubts and opposition. The time saved, however, was so material that the Ministry of Shipping pressed that the system should be continued.

An improvement as regards escorts was obtained later when the continuous escort by patrol gunboats from England to Port Said and back was maintained instead of the change of escort as had been necessary for the first convoys. As a result the convoys were sailed at intervals of about 16 days up to the time of the Armistice. The estimate of the saving of 40 vessels proved correct, and when demands arose in 1918 for increased accommodation for ships from the United States to France, a large number of P. and O., British India, Bibby, Brocklebank, and other Indian boats were available for the transport of troops. If the Through Mediterranean Convoys had not been inaugurated, however, these vessels would still have been required to bring essential imports from the East.

It is important to emphasize that these Through Mediterranean Convoys maintained:—

A. Supplies of coal to Egypt, including supplies for themselves on the homeward journey.

B. The essential cargoes required from India and the Far East and at the same time set free:—

(*a*) Additional tonnage to take coal to Italy.

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(*b*) Additional tonnage to bring troops and essential cargoes from North America.

This is one of the most striking examples of the manner in which central control of shipping and its movements enabled greatly increased efficiency to be obtained in the saving of tonnage.

In order to realize how interwoven was the whole programme, the general system which had been reached in November, 1918, is quoted as an example. The sailings of the homeward "Through Mediterranean Convoy" had to be fixed in relation to the sailing of the homeward medium troop convoy from Canada, and in order to have even intervals for outward sailings from Devonport and Milford, convoys from Sierra Leone and Dakar had to be arranged at dates to suit convoys from New York and Gibraltar respectively. Sailings from Dakar during the first half of 1918 in their turn had affected the date of departure of convoys from Rio de Janeiro, because the latter convoys combined with the Dakar Convoys en route.

*Convoys for United States Troops,* 1918. The fact that a convoy system was in working order at the beginning of 1918, when the urgent need for additional troops for France arose, facilitated the arrangements for the transport of United States troops. During 1918, more than a million troops were brought from North America in British convoys, and during the summer of that year an average of over 300,000 per month was obtained.

If the success of the convoy system as a defence

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against submarine attack had not been amply demonstrated by the end of 1917, it is questionable whether the United States Government would have ventured to send their men across so rapidly and in such large bodies; and there is no doubt that it would have taken some time to get a decision on the best course to pursue and then to build up a system to put it into effect. As it turned out, the organization adapted itself to troop carrying on a large scale with little more than the dispatch of a few telegrams. Ships were altered from the carriage of cargo to the transport of men, and in some cases the type of ship was varied; but the programme was carried on just as before, with alterations in the speed of certain convoys, and with a slight increase in the size of the destroyer escorts and the extension of their destroyer rendezvous farther west.

In the autumn of 1917 a troopship convoy (H.X. Convoy) for Canadian troops was already running from Halifax, including also fast merchant ships of over 12½ knots. In 1918, the first step taken by the Ministry of Shipping to meet the new needs was to transfer to the North Atlantic as many fast ships as could be found in other trades suitable for inclusion in these convoys, and to get them fitted as speedily as possible for troop carrying. Many of the ships released from Eastern service by the introduction of Through Mediterranean Convoys were utilized for this purpose. To expedite the turnround of these faster vessels, it was decided to alter their port of assembly from Halifax to New York and to increase the minimum speed to 13 knots with a capacity

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for 13½ knots in the danger zone. By assembling at New York the embarkation of United States troops was also much facilitated.

It was soon found, however, that, in view of the urgent requirements in France and of the number of United States troops available, the number of vessels suitable for H.X. Convoys was so limited as to be quite insufficient to meet the needs. A suggestion was made that troops might be carried in the 9½-knot vessels sailing in H.N. Convoys; but the United States Government demurred, and, moreover, there were not many of these vessels suitable for conversion into troopships. The Ministry of Shipping, however, in searching for faster vessels had found that there was a large number of steamers capable of maintaining from 11½ to 12 knots, but not fast enough for inclusion in H.X. Convoys, and yet very suitable for troopships. It was not practicable, from a Naval point of view, to provide additional escorts for another convoy, nor was it desirable to increase the number of convoys, from a routeing standpoint. The question, therefore, was how a medium-speed troop-convoy could be established in the place of one of the existing convoys. Exhaustive statistics had been worked out by the Convoy Branch of the Ministry of Shipping and they proposed that a number of the cargo liners which habitually sailed in the H.N. Convoys should be transferred to the South American trade, being replaced on the North Atlantic trade by the vessels able to maintain over 11½ knots, and that when this change was made the West-coast H.N. Convoys should cease, and that in

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their place should be instituted an 11½-knot convoy with cargo and troops sailing from Halifax alternately to the East and West Coasts at 8-day intervals. Thus there would be no increase in the convoys arriving every 8 days, but instead of an 8-day West-coast H.N. Convoy, there would be an H.C. Convoy to the East Coast every 16 days and to the West Coast every 16 days. The reason for having an East-coast H.C. Convoy was that many of the ships were carriers of frozen meat and their cargoes were required in North France and in London; moreover, the cold storage at Liverpool was very limited, and it would have been impossible to deal with all the meat cargoes in that port. An integral part of this scheme was also that a proposal, which had been made early in January, to transfer to New York every steamer of high speed, should be carried out. In this way cargoes from the West Coast which had hitherto been carried in H.N. West-coast Convoys should to some extent be carried by fast ships now diverted to the West Coast. All fast ships (i.e. H.X. ships) were, therefore, in future to come to the West Coast, the cargoes for the East Coast being sent in H.N. or H.C. ships in lieu. The destroyer escort for the H.C. East-coast Convoy was provided by transferring from Buncrana to Devonport an escort which had hitherto met the H.N. West-coast Convoy every 8 days. As the H.C. Convoy had to be escorted as far as Folkestone Gate this escort could only meet a convoy every 16 days. The escort for the H.C. West-coast Convoy was provided from Queenstown, which was relieved from the duty of meeting the Dakar Convoy;

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the latter convoy was provided for by utilizing the outward escort of an intermediate Gibraltar Convoy from Milford. A good deal of dovetailing was therefore necessary to fit the new convoy into the existing system without increasing the number of separate destroyer escorts.

In addition to H.X. and H.C. Convoys dealt with above, there were two other means of transporting United States troops:—

(*a*) United States direct troop-convoys from New York to the Bay of Biscay entirely controlled and escorted by the United States, but routed in co-ordination with the routeing chart at the Admiralty. Ultimately these convoys were run at an average rate of two per eight days, a faster one of about three ships, often unescorted, and a medium one of a larger number of ships escorted. They were met by United States destroyer escorts from Brest and latterly these escorts on their way out also escorted an outward convoy (O.R. and O.V. Convoys). The United States used for these convoys the faster German ships which had taken refuge in their ports in 1914.

(*b*) The "Monster" Transports:—
*Olympic, Mauretania, Aquitania,* and *Leviathan* (ex-German *Vaterland*). These vessels, which were heavily armed, sailed as single units depending on their speed and armament for protection on the ocean voyage against a raider, but they

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were met by a destroyer escort on arrival in the submarine danger-zone. The first three ships were manned and run by the British Navy, the *Leviathan* by the United States Navy. In 1918 the first three ships brought over 135,467 troops.

The number of troops, United States and Canadian, which left North America for the United Kingdom during the different months in 1918 in H.X. and H.C. Convoys and the three British "monster" transports were as follows:—

| | |
|---|---|
| January | 22,440 |
| February | 25,447 |
| March | 27,787 |
| April | 60,455 |
| May | 127,560 |
| June | 148,964 |
| July | 208,846 |
| August | 163,020 |
| September | 143,490 |
| October | 94,309 |
| November | 14,798 |
| | 1,037,116 |
| Of these the number conveyed in H.X. Convoys was | 631,230 |
| The number conveyed in H.C. Convoys | 270,419 |
| The number conveyed in "monster" transports | 135,467 |
| | 1,037,116 |
| The number of United States troops was | 954,416 |
| The number of Canadian troops was | 82,700 |
| | 1,037,116 |

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To summarize these results, the total number of troops carried across the Atlantic in accordance with this system between January and November 1918 was 1,037,116, and the total number of troops lost in these transport operations was 637, i.e. 0·061 per cent.

*Rio de Janeiro Convoys.* Early in 1918 arrangements were made to institute direct convoys between Rio de Janeiro and the United Kingdom in order to bring home the Argentine wheat crop which had been purchased for the Allies. These convoys were at first restricted to ships below 10 knots, and, in order to economize both ocean and destroyer escorts, they were combined with convoys from Dakar (H.D.) at a rendezvous off Dakar (forming H.J.D. Convoys). For a short while, convoys containing ships of 10 knots and over also sailed from Rio de Janeiro, joining up off Sierra Leone with H.L. Convoys (forming H.J.L. Convoys). The extension of submarine activity to the West Coast of Africa had made these convoys necessary, and they were continued from March until August, 1918.

*Size of Convoys.* The size of the first trial convoy (May 1917) from Hampton Roads was limited to 12 ships, but this limit was raised early in June, 1917, and was increased to 20 at the end of that month. In September, 1917, it was laid down by the Admiralty that no convoy should be composed of more than 26 ships without reference to the Admiralty. It was found necessary to allow a considerable increase in the maximum numbers, but special reference had to be made to the Admiralty in any case exceeding 36 ships,

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and endeavour was made to keep the numbers below this in the case of convoys coming North-about through the Irish Channel. The largest Atlantic Convoy sailed was H.N.73, which left New York on June 18, 1918, composed of 47 ships, of which four were detailed to the Mediterranean. This convoy was entirely successful.

ATLANTIC CONVOYS WHICH SAILED FROM COMMENCEMENT OF THE SYSTEM UP TO NOVEMBER 16, 1918.

| HOMEWARD. | | | OUTWARD. | | |
|---|---|---|---|---|---|
| *Distinguishing Letters and Numbers of Convoys (Inclusive)** | | *Net No. of Convoys* | *Distinguishing Letters and Numbers of Convoys (Inclusive)** | | *Net No. of Convoys* |
| H.H. | 1–75 (less 29) | 75 | O.D. | 1–136 (less 84) | 135 |
| H.N. | 1–90 | 89 | O.Q. | 1–31 (less 25 and 30) | 29 |
| H.X. | 1–55 | 55 | O.B. | 1–89 (less 28, 30, 37 and 39+2 "special") | 87 |
| H.S. | 1–61 | 61 | O.L. | 1–40 (less 25) | 39 |
| H.C. | 1–23 | 23 | O.L.B. | 1–14 | 14 |
| H.B. | 1–19 | 19 | O.L.X. | 39–51 | 13 |
| H.G. | 1–120 (less 36) | 119 | O.C. | 1–10 | 10 |
| H.D. | 1–56 | 56 | O.F. | 1–57 | 57 |
| H.L. | 1–55 | 55 | O.M. | 1–113 | 113 |
| H.J.D. | 1–19 | 22 | O.E. | 1–24 | 24 |
| H.J.L. | 1–3 | | | | |
| H.E. | 1–22 | 22 | | | |
| | TOTAL | 596 | | TOTAL | 521 |

*The numbers in parentheses refer to Convoys omitted, or, in cases of H.N. 29 and H.G. 36, scattered by a gale.

## ROUTEING OF CONVOYS

*Convoy Routeing Chart.* The system of routeing Atlantic Convoys was based on a special Secret Rendezvous and Route Chart.

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*North Atlantic Convoy Routes.* The routes of North Atlantic Convoys as far as 22° W. were fixed by the Port Convoy Officer at the Port of Assembly, under the general directions from the Commander-in-Chief, North America.

The general method of routeing for the winter of 1917 was laid down after consultation between the Admiralty and the Commander-in-Chief. Somewhat later, this routeing was modified to admit of a system of lines for the West-going traffic, so as to prevent as far as possible collision between West-going traffic and East-going Convoys.

"*North-about Route.*" Special instructions were issued from time to time for convoys arriving by the "North-about route," i.e. by the North of Ireland, so that they should pass through a certain area during daylight. These were varied from time to time according to the submarine situation or the period of the year.

*Time of Arrival at Destroyer Rendezvous.* The time of day at which Homeward Convoys should arrive at the Destroyer Rendezvous was altered from time to time so that as nearly as possible they should arrive at daylight.

The actual course as given to the convoy up to 22° W., was telegraphed to the Admiralty and communicated by the Admiralty to the Commander-in-Chief, Grand Fleet, and also latterly to the Commander-in-Chief, Queenstown, and the United States Rear-Admiral commanding the U.S. Battle-Cruiser Squadron at Berehaven, for their information and guidance in

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case of a raid by an enemy battle-cruiser. All these convoys were also eventually given alternative routes "North-about" or "South-about" so as to admit of their being diverted in case of necessity. Advantage was taken of this during two occasions of moonlight, when on each occasion three nominally "North-about" convoys were brought in by the South of Ireland. It is interesting to record that we became aware by intercepts of wireless signals made by German submarines working North of Ireland that they were complaining that they could not sight any merchant ships.

The United States fast Troop-Convoys (T.C. Convoys) which were entirely controlled by the United States Naval authorities, between the United States and the Bay of Biscay, were at first routed quite independently of the general convoy system; but later, before they were given their route, the United States Naval Liaison Officer consulted the Chart Room and based the route on the same method and clear of other convoys, and informed the Chart Room of the route given to the particular convoys.

In view of possible submarine activity off Sydney and Halifax use was made of the Belle Isle Straits for convoys from the St. Lawrence during the summer of 1918.

Special arrangements were made for routeing South Atlantic Gibraltar Convoys, Through Mediterranean Convoys and Outward Convoys in order to meet local conditions and to avoid possibility of collision.



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*Route from the Destroyer Rendezvous.* The routes of Homeward Convoys as given in the route telegraphed was only followed as far as the Destroyer Rendezvous; from thence the route to the final destinations of the vessels was ordered by the Admiralty and embodied in the instructions for the destroyer escort, which were sent out in letter-form from the Admiralty. These routes were dependent on the general situation at the time and upon the destinations of the vessels. Vessels in South Atlantic Convoys for Bay of Biscay ports were detached at the nearest point to the outer position of the approach-route in force, and thence along the approach-route to their destinations.

*Distribution of Convoy Movement Information.* The guiding principle throughout was to keep all authorities who were responsible for the sailing of convoys fully informed regarding routes and movements of convoys which would affect them. For this purpose, in addition to the responsible authorities in the United Kingdom, the officers responsible for the cross-Channel French coal trade were kept informed of movements of convoys into and out of the mouth of the Channel, so that they might suspend or alter their sailings as necessary. Similarly, Brest was kept informed of the convoys which might affect the sailing of the U.S. convoys from the Bay of Biscay ports. Officers in charge of Outward Convoys were informed of the routes of Homeward Convoys which they might pass.

*Routes after Dispersal.* On dispersal, the ships of the convoy followed the coastal approach-routes to their

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destinations, unless otherwise ordered. These approach-routes were given to them before sailing, any alterations which might have been made since three days before the convoy sailed being given to them by the destroyer escort before dispersal.

*Routes in Case of Separation.* Independent routes were given in sealed packages to the master of each vessel before sailing, to be used only in the event of their falling out of convoy.

*"Successful" Telegram.* As soon as the safe arrival of the convoy was known or could be reasonably assumed, a "Successful" telegram was sent to the Commander-in-Chief of the foreign station concerned, and also to the Port Convoy Officer at the port of departure—"Convoy H.H., etc., successful." In the event of any casualties these were notified, i.e. "of Convoy H.H., etc., S.S. *Amanda* torpedoed and sunk."

Losses or casualties after the ships had been handed over to Coastal Patrols were not included in "Convoy" losses. For example, when a convoy (East Coast) was dispersed without loss at Folkestone Gate, it was "successful" so far as the Convoy System was concerned, though the vessel might be lost before reaching her final port of destination, say, the Tyne—similarly with losses under local French escort, after the arrival of the Bay Ports detachment at Brest.

These telegrams were much appreciated by the officers concerned, especially as the number of those "Successful" was very large. There is no doubt that the receipt of immediate information of the success of

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an enterprise maintained enthusiasm and, therefore, increased efficiency. Every endeavour was made to let officers concerned know how the Convoy System was working, by furnishing them with these telegrams and also by the periodical issue of statistics and other information in Mercantile Convoy Memoranda.

*Tugs Employed with Convoys.* Soon after the commencement of the Convoy System it was realized that the presence of an ocean-going tug with the convoys in the danger-zone would be of great assistance, either in the salving of a torpedoed vessel, or even in the case of a machinery break-down or shortage of coal, when a vessel would be more at the mercy of an enemy submarine. Accordingly, arrangements were made with the Tug Section (June, 1917), and the Tug Bases concerned (Queenstown, Buncrana and Scillies) were instructed to send out two rescue tugs to meet each convoy from the North Atlantic.

*Dispersion of Homeward Convoys.* The Convoy Committee had recommended as its second general principle that "homeward-bound convoys should as far as practicable be brought to their ports of discharge. Arrangements should, therefore, be made as far as possible for homeward-bound ships to be grouped according to their ports of discharge; this can be done commercially, provided that programmes of sailings are arranged at least a fortnight in advance." The committee, in accordance with their instructions, had also suggested ports for dispersion of homeward convoys. In the case of the first trial convoys from Gibraltar and

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Hampton Roads instructions were given for the East Coast ships to be brought into Portland, and from this port they were sailed under special arrangements to Folkestone Gate. In the case of the small Troop-Convoys which, prior to the introduction of the general convoy system had sailed from Sierra Leone to England, the ships were brought into Devonport in order to land their troops, but the facilities at Devonport did not admit of their discharging their cargo at that port, and it was, therefore, necessary for them to sail from Devonport usually to London. There were cases in which the ships were torpedoed between Devonport and London, causing a certain amount of outcry in the public Press.

Under the general convoy system, in order to save the double risk from submarine attack and mines, and also to save delay, it was the aim to bring ships direct to their destination without calling at any intermediate port. Consequently it became unnecessary to utilize ports of dispersion. In case of submarine activity in the English Channel or in the Irish Sea, special instructions were given for the convoy to be escorted either to Folkestone Gate or to Liverpool, or such lesser distance as might be desirable at the time. In a few special cases, however, convoys were put into Milford, Plymouth, or Spithead.

As regards the West Coast Convoys from the North Atlantic, the later development in 1918 was for the convoys to be escorted as far as Liverpool, and for the destroyer escort then to take an outward convoy from Liverpool. In the case of the East Coast Troop-Convoy

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(H.C. Convoy), the whole destroyer escort remained with the convoy as far as Folkestone Gate. For other East Coast convoys, the destroyer escort, or such portion of it as was necessary, remained with the convoy as far as St. Catherine's, Beachy Head, or Folkestone Gate, according to circumstances, relief escorts being provided by Portsmouth when necessary. The returning vessels of the destroyer escort were utilized to escort oilers from Folkestone Gate to Devonport for the Outward Convoy.

*Factors Limiting Convoys.* It has been seen that the basis on which the Atlantic Convoy rested was the provision of destroyer escorts, and it was only as more destroyer escorts were made available that the system was extended as above. Ocean escorts were easier to obtain.

The second limiting factor was that, so far as possible two convoys should not arrive for the East Coast or for the West Coast on the same day. This restriction was to avoid the possibility of convoys meeting and also to avoid the suspension, in the case of East Coast Convoys, of the cross-Channel traffic more than once in the same day. The programmes for the North Atlantic and for the South Atlantic were thus interdependent, and all convoys had to be co-ordinated.

When the Convoy System was in full working order there was always an average of 16 homeward convoys at sea, of which three were in the home submarine danger-zone, i.e. under destroyer escort, and there was an average of seven Outward Convoys at sea, of which

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from four to five were in the home submarine danger zone.

*Shortage of Destroyers.* The shortage of destroyers for escort work was felt up to the date of the Armistice. The following correspondence shows this:—

On July 29, 1918, proposals were made to the Admiralty to alter the dates of sailing of the slow Sydney (C.B.) Convoys in order to meet the following requirements:—

> "(A) The interval between H.C. and H.S. Convoys to be four days. (B) The interval between H.S. East Coast and H.N. Convoys to be increased to enable ships of 9½ knots loading St. Lawrence and unable to arrive with H.S. East Coast Convoy to join the H.N. Convoy, New York. (C) To allow ships missing slow Hampton Roads Convoy to join convoy at Sydney without change of destination."

The reply stated that the arrangements proposed were not practicable for the following reasons. The whole convoy system had to be arranged to fit in with destroyer escort requirements so that on each trip each destroyer escort could be utilized both for Outward and Homeward Convoys. As each destroyer escort took out and brought in a convoy every eight days the programme embraced South Atlantic and Mediterranean Convoys as well as North Atlantic Convoys. The suggested alteration for H.S. Convoys would affect escort of H.H. Convoys and also of Outward Convoys.

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This reply indicates the difficulties of making any alterations in the programme owing to the limited number of destroyer escorts which were even then available, and also to the fact that the South Atlantic and Mediterranean Convoys were interwoven in the scheme for the whole of the convoys!

*Analysis of Losses and Advantages.* By the end of October, 1917, 99 homeward convoys had been brought in, comprising 1,502 steamers of an estimated total deadweight capacity of 10,656,300 tons, with a loss of 0·66 per cent. (or 10 vessels), torpedoed while actually in contact with the convoy. The number of ships which had been sunk after being separated from their convoys by bad weather or by other causes was 14; so that the gross total including these vessels was only 1·57 per cent. With experience, and as masters realized more generally that their safety depended on their continuance with their convoy, the difference between these two categories of loss became appreciably less, the figures at the signing of the Armistice being 0·78 ships lost when in convoy formation and 1·13, including those which had lost touch with the convoy.

The figures at the end of November 1917 for convoys escorted outwards through the United Kingdom danger-zone were 77 convoys, 1,052 ships, 6,999,500 tons total deadweight capacity, and percentage of loss 0·57 per cent.

The statistics for British ships only, at the end of December, 1917, showed that during the five months April to August the losses over 50 miles from the

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land were 175, an average of 35 per month; during the period from September to December the ships sunk at this distance from the land for the whole four months only reached a total of six, of which four were sunk in September. In other words, before convoys were in full operation, nearly 60 per cent. of the ships sunk were in the open sea, but when the effect of convoys was felt, this proportion of the vessels lost became insignificant.

The result from the point of view of life-saving was enormous. It meant that a crew, even when their ship was torpedoed and they had to take to their boats, were rarely more than 10 or 20 miles from the land, and probably had a coastal patrol boat to their assistance in less than half an hour. This was a very different ordeal from that which had to be faced in the first six months of 1917, when the ships were sunk 200 and 300 miles from the land, and when a large proportion of those who managed to get into their boats died from exposure before they were rescued or reached land.

Moreover, it practically eliminated the danger of the master or chief engineer being taken prisoner by the submarine. This was a device which the Germans had adopted with a view of impairing morale, and it is a credit to the Mercantile Marine that they stood for so long the risks to which they were opposed with very little chance of retaliation.

An extra call was made on the seamanship of the masters and officers, but they were relieved from the anxiety of interpreting Admiralty orders, and from the

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responsibility of deciding how they should be executed in widely differing circumstances, with very vague knowledge of the potentialities of a submarine. For example, under the convoy system, war warnings and individual distress signals were no longer a matter for the shipmaster, but demanded action on the part of the Officer in Charge of the convoy.

The possibility of salving a torpedoed ship was also vastly increased, and in the case of a convoy casualty there was usually help near at hand in the shape of two or more tugs under the special arrangements made.

*Modifications in Home Waters.* With a partial Convoy System the tendency of the enemy submarines appeared to be to attack ships not in convoy. They preferred ships which had dropped out of a homeward convoy or ships proceeding independently from a loading port to the port of assembly. This made it necessary to extend the convoy system to cover all sailings, homeward and outward, through the submarine danger-zone, and to bring the ports of assembly for outward convoys at home as near as possible to the ports of loading, and to keep the homeward convoys together as far as possible till they reached their final destination or in the case of East Coast convoys, Folkestone Gate. Two of the alternative ports of assembly for outward convoys named by the Convoy Committee and first used for outward convoy were Lough Swilly (Buncrana) and Queenstown. The initial venture from Lough Swilly was disastrous; while the vessels, which had left Lough Swilly in single file,

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were forming up about 20 miles from shore, they were attacked by two submarines. Two merchant ships were sunk and an armed merchant cruiser was seriously damaged; the remainder had to put back into Lough Swilly and were delayed there some time before being sailed independently. The submarines had evidently watched the ships arriving at Lough Swilly and awaited their opportunity. This was rather a serious setback to the advocates of the Convoy System, but the lessons learnt were valuable and Lough Swilly was not again used. Steps were hastened to complete the local anti-submarine defences at Lamlash, which was then adopted as the port of assembly for ships from Liverpool and the Clyde. Later, during 1918, owing to losses between Liverpool and Lamlash, convoys were assembled at Liverpool and sailed under escort direct from Liverpool, Lamlash being only used for ships in the Clyde, except when, owing to inactivity in the Irish Sea, it was convenient to use Lamlash in order to save destroyer escorts.

As regards Queenstown, a number of vessels bound to that port for convoy from Liverpool or the Bristol Channel were lost towards the end of 1917. An attempt was made to utilize Rosslare as an assembly port in lieu, but owing to this being open to observation from the sea, it was found to be unfit for the purpose and the first convoy from Rosslare was not successful. In consequence, ships which had hitherto sailed in convoy from Queenstown were now included in the convoy from Milford for Gibraltar, being detached for the North or South Atlantic at suitable points en route;

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this necessitated reductions of speed of these vessels as the Milford convoy's minimum speed was 7 knots, but the results were extremely satisfactory and proved that large convoys (the convoys leaving Milford were frequently of 30 or more ships) have in themselves a source of protection. In the case of outward convoys from Devonport and Falmouth there was also considerable loss in the English Channel between Folkestone Gate and the port of assembly.

*Commodores of Convoy.* Among the recommendations of the Convoy Committee was the appointment of "Commodores of Convoy." A "Commodore of Convoy" was a Naval or Naval Reserve officer, who sailed in one of the merchant ships in convoy, and who took charge of the convoy in the absence of an ocean escort or in certain convoys when he was senior to the officer commanding the escort. Generally his function was to maintain the unity of a convoy as a separate entity so that it could navigate itself and, if required, act independently of an escort. An escort could thus detach itself for attack or defence, or in case of an escort breaking down the convoy could continue its voyage, the secret course and rendezvous being known to the commodore.

In the case of homeward North Atlantic Convoys escorted by United States cruisers the commodore had special responsibility, as the cruisers left the convoy at about long. 20° W., and thence the commodore remained in charge without escort and had to guide the convoy to the destroyer rendezvous.

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A further useful result from this system was that the officers permanently employed as commodores gained great experience in handling ships in company, and were able to advise and assist officers of ocean escorts detailed to this service in its later stages.

*Instructions to Masters.* Special convoy signalling instructions and also general instructions for masters of ships in convoy were prepared on the lines of the Convoy Committee's report, and instructions were developed into the Allied Signal Manual.

Great stress was laid also upon the personal conference of masters with the officer in charge of the convoy. This conference was held before sailing, and it enabled the general procedure and any special features to be explained to the master. It proved to be one of the most important factors in the successful handling of convoys, and established a bond of knowledge and sympathy between those taking part in each convoy venture.

*Summary of Organization.* The preceding paragraphs show the various elements of the Convoy Naval Organization:—

(*a*) Central direction to fix programmes and routes and to allot ocean escorts, commodores, and destroyer escorts.

(*b*) Shipping Intelligence Officers or corresponding officers abroad, by whom ships are shepherded to the ports of assembly.

(*c*) Port Convoy Officers who assemble the orders and see to equipment of merchant ships.

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(*d*) Ocean escorts and commodores who organize and command the convoy.

(*e*) Destroyer escort which meets the convoy.

Then (*b*) and (*c*) again at the other side, who dispatch the ship for her return voyage.

*Allied Co-operation.* In the working of the Atlantic system, close co-operation was maintained with the United States and French Naval Authorities by means of Liaison Officers in London and at Washington and by meetings of the Allied Naval Conference. There was complete co-ordination of forces and procedure, and all the Naval forces were collated as one force. As it may be a matter of some historical interest to know the relative parts played by the various Navies concerned, the following is quoted from a brief Summary of the United States Naval activities in European waters, with an outline of the organization of Admiral Sims's Headquarters—which was prepared for a Naval Committee of Congress on tour of inspection abroad, by the Intelligence Section of Admiral Sims's staff. August 3, 1918.

MEMORANDUM ON ATLANTIC CONVOY SYSTEM
(As requested by the House Naval Committee)

A significant illustration of the relative parts being played by the U.S. Navy and the Allied Navies is given by a study of the Atlantic Convoy System and by the protection and escorting of American troop convoys to Europe.

Taking into consideration the whole Atlantic Convoy System—that is, all shipping in the Atlantic, whether

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French, Italian, American, British, or neutral shipping in Allied interests; also U.S. troop transports and troop convoys bound for the Mediterranean—the shipping is protected by the naval vessels of the Allies in the following proportions:—

Great Britain provides destroyers for 70 per cent. of all convoys.

United States provides destroyers for 27 per cent. of all convoys.

France provides destroyers for 3 per cent. of all convoys.

All convoys at sea in the Atlantic are protected by cruisers so as to guard against attack by enemy raiders. The cruisers necessary for protecting the Allied shipping in the Atlantic in this way are provided as follows:—

| | |
|---|---|
| Great Britain | 61 per cent. |
| United States | 35 per cent. |
| France | 4 per cent. |

Great Britain has organized and arranged and provides the signal codes and instructions for the entire Convoy System; also commodores and signal men for the great majority of all convoys.

The Convoy System usually carries the shipping as far as the European coast, where it is generally diverted on a coastal route as to its destination. This necessitates a great amount of coastal escorting. Great Britain provides coastal escorts for the Irish Sea, English Channel and North Sea, and in general, throughout all coastal waters of the United Kingdom.

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Great Britain also provides destroyers for all Allied shipping across the North Sea; escorts for practically all shipping across the English Channel between England and France, and also keeps all channels in British waters clear of mines.

There is very little coastal escort required on the French Channel coast, as all shipping follows the English coast. On the French Atlantic coast the United States furnishes three-eighths of the coastal escort, and France furnishes the remaining five-eighths. The United States also furnishes about one-third of the mine-sweeping forces on the French Atlantic coast.

British destroyers are now rendering the following protection to United States shipping:—

*U.S. Troops.*

(*a*) British destroyers escort 62 per cent. of the U.S. troops that come into England.

(*b*) British destroyers escort all of our troops that cross the English Channel going to France.

(*c*) British destroyers escort all U.S. troop ships bound up or down the English Channel.

*Army Store Ships.*

(*a*) British destroyers bring into the English Channel about half of the store ships that carry supplies for the U.S. Army.

(*b*) British destroyers escort into Scottish ports all U.S. mine carriers bringing mines for the North Sea barrage.

*U.S. Merchant Shipping.*

(*a*) British destroyers provide the coastal escort for

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U.S. ships along the south and east coast of England.

(*b*) All U.S. trade with Scandinavia is escorted by British destroyers.

(*c*) All U.S. trade with Holland is escorted by British destroyers.

(*d*) All U.S. ships bound out of the English Channel from either French or British ports are escorted to the westward by British destroyers.

*To Whom Credit is Due.* The main credit for the success of the Convoy System must for all time rest with those who actually served at sea; the Navy, represented by the ocean escorts, Commodores of Convoy, and the destroyer and trawler escorts; the Mercantile Marine, represented by the masters and crews of all the ships that sailed the Atlantic. The manner in which the two sea services worked in unison and met the new requirements surpassed all expectations. No weather seemed too bad for the destroyers; no convoy tactics seemed too difficult for the Merchant Masters. The Board of Admiralty in 1918 expressed their gratification as follows:—

"On the occasion of the first Meeting of the Board of Admiralty after the signing of the German Armistice, their Lordships desire, on behalf of the Royal Navy, to express their admiration and thanks to the Owners, Masters, Officers and Crews of the British Mercantile Marine, and to those engaged in the fishing industry, for the incomparable services which they have rendered



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during the war, making possible and complete the victory which is now being celebrated.

"The work of the Mercantile Marine has been inseparably connected with that of the Royal Navy, and without the loyal co-operation of the former, the enemy's submarine campaign must inevitably have achieved its object. The Mercantile Marine from the beginning met this unprecedented form of warfare with indomitable courage, magnificent endurance, and a total disregard of danger and death, factors which the enemy had failed to take into account and which went far towards defeating his object.

"In no small measure also has the success achieved against the submarine been due to the interest taken by owners in the defensive equipment of their ships, and to the ability, loyalty and technical skill displayed by Masters and Officers in carrying out Admiralty regulations which, though tending to the safety of the vessel from submarine risks, enormously increased the strain and anxiety of navigation. The loyal observance of these precautions has been the more commendable since the need for absolute secrecy, on which safety largely depended, has prevented the reasons for their adoption being in all cases disclosed.

"Further, the Convoy System, which has played such an important part in frustrating the designs of the enemy and securing the safe passage of the United States Army, could never have attained its success but for the ability and endurance displayed by the Masters, Officers and Crews of the merchant ships forming these Convoys.

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This system has called for the learning and practising of a new science—that of station keeping—the accuracy of which has depended in no small measure on the adaptability and skill of the engineers and their departments.

"Their Lordships also desire to acknowledge the ready response of Owners to the heavy calls made on the Merchant Service for officers and men to meet the increasing requirements of the Navy. On board our ships of every type, from the largest 'Dreadnought' down to the smallest Patrol Boat are to be found officers and men of the Merchant Navy who have combined with those of the Royal Navy in fighting the enemy and defeating his nefarious methods of warfare at sea.

"The Merchant Service and the Royal Navy have never been so closely brought together as during this war. In the interests of our glorious Empire this connexion must prove a lasting one."

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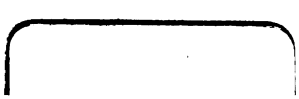

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